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DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECAS--ETC(U)
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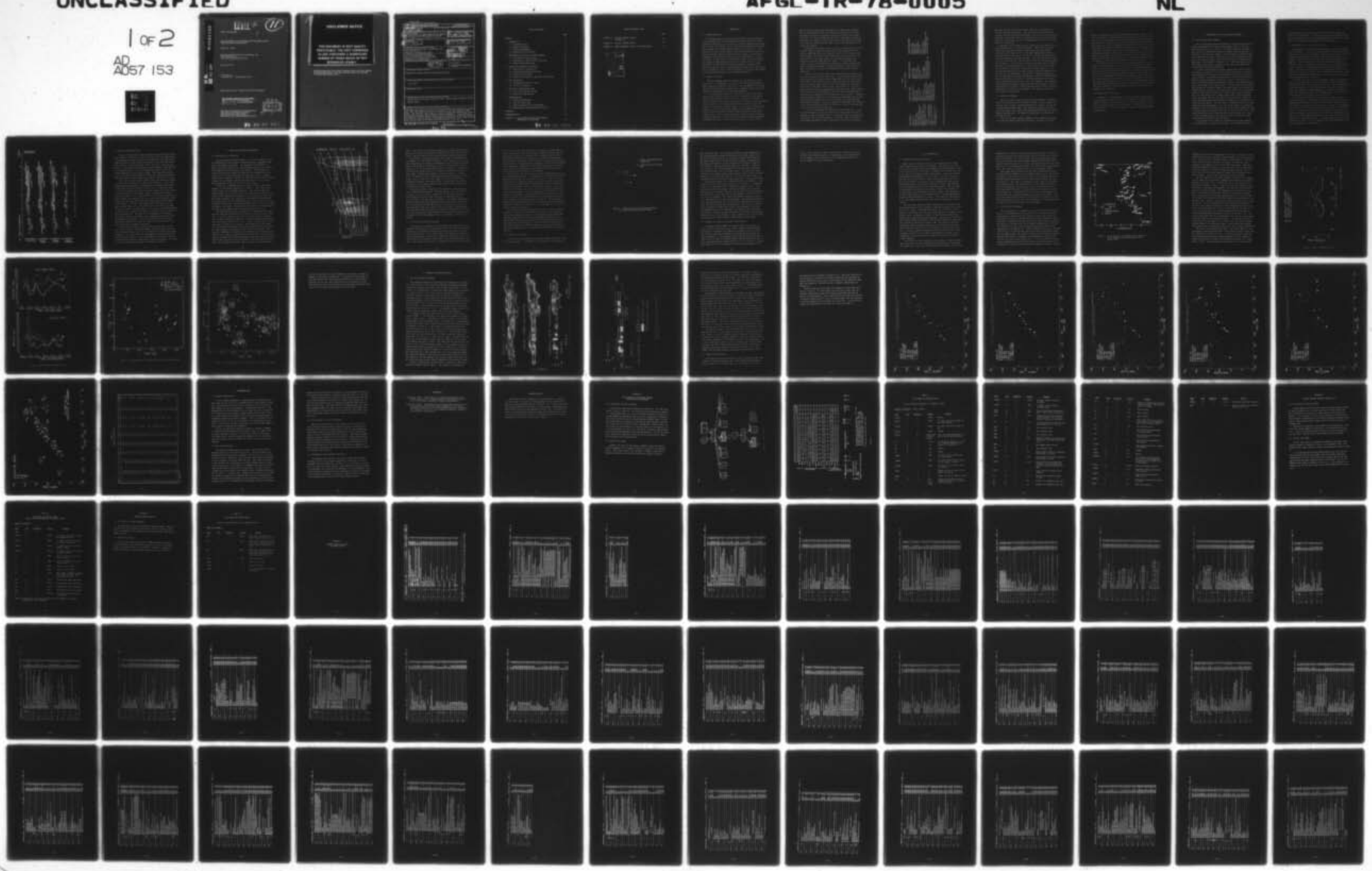

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AFGL-TR-78-0005

DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECASTS

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December 1977

Final Report
1 January 1977 - 30 September 1977

AD No.____
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFGL-TR-78-0005	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECASTS		5. TYPE OF REPORT & PERIOD COVERED Final rept. 1 Jan [redacted] - 30 Sep [redacted]77
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Robert K. Crane		8. CONTRACT OR GRANT NUMBER(s) F19628-77-C-0058
9. PERFORMING ORGANIZATION NAME AND ADDRESS Environmental Research & Technology, Inc. 696 Virginia Road Concord, Massachusetts 01742		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62101F 667203AD 03
11. CONTROLLING OFFICE NAME AND ADDRESS Air Force Geophysics Laboratory Hanscom AFB, Massachusetts 01731 Monitor/A.C. Chmela/LYW		12. REPORT DATE Dec[redacted] 1977
		13. NUMBER OF PAGES 180
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 179 p.		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

391 776

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

weather radar, echo areas, convective cells, severe storms, tangential shear, Doppler spread

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Algorithms were developed for the detection and tracking of reflectivity, tangential shear, and Doppler spread cells as detected by a single Doppler weather radar. The previously developed cell detection program was extensively revised to increase speed and reduce computer storage requirements. A new volume cell detection and tracking program was developed to combine the radar data obtained on successive scans to provide a three-dimensional analysis of the radar detected cells and to establish the motion and time histories of the cells.

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1. INTRODUCTION

1.1 Program Objectives

The ultimate goal of the work reported herein is the development of a real-time method for the short-range (0-20 minute) forecast of storm development and motion. The initial step in this program was the development of objective techniques for the efficient representation of information obtained from a single Doppler weather radar (Crane, 1977). The radar data are processed to obtain fixed and peak referenced reflectivity contours and peak referenced tangential shear contours. The essential information contained in the contour data are represented by a set of attributes. In this report, we consider the second step in the program, the assembly of data obtained from a set of radar scans into a set of attributes that characterize the three-dimensional structure of the small precipitation cells and surrounding echo regions, their motion, and their development in time. Initial consideration is given to the problem of forecasting precipitation cell development and motion.

1.2 Summary of Results

The work performed under this contract was concentrated in three major areas: (a) improvement to the cell detection program developed under the previous contract (Crane, 1977), (b) development of the volume cell detection and tracking program, and (c) preparatory data analysis to support the development of cell forecast algorithms.

The cell detection program was extensively revised to reduce the amount of core storage required for some of the integer arrays used in peak referenced contour analysis; to process reflectivity, tangential shear, and Doppler spread data simultaneously; to include spread information in the reflectivity and tangential shear peak attributes; to use the relatively spiky nature of ground clutter as an aid in rejecting ground clutter; to resolve automatically Doppler velocity ambiguities using radial velocity data from resolution elements adjacent in range and in azimuth; and to vary the quantization steps used in the peak referenced contouring operation. In the process of revising the program additional refinements were made in the cell detection logic to correct several

defects detected using actual radar data and to improve the technique used to store temporarily the peak referenced contour data to increase the speed of the processing algorithm and reduce overall core storage. At present, the entire program required for the simultaneous processing of reflectivity, tangential shear, and Doppler spread data fits into the core storage available on the CDC 6600; a result not anticipated at the start of the program.

The program is currently relatively slow in operation due to (1) the extensive number of input and output tape or disk operations used to read the input radar data, store data for plotting, store data for subsequent volume cell detection and tracking and to store data for B scan printouts and (2) the large number of bit manipulation operations required to pack and unpack data for storage. A considerable time savings can still be accomplished by reducing the amount of output data and by rewriting the program in assembler language to reduce the time spent in subroutine calls for bit manipulation and indirect storage addressing.

A volume cell detection and tracking algorithm was developed to combine the data from successive radar scans. The fixed and peak referenced contouring operations are performed independently for each azimuth scan of the radar. The reflectivity cells (peak referenced) are associated from one elevation angle to the next to form a volume cell and from one volume cell to the next to form a track. The reflectivity cells are used to identify the basic organization of the radar data. Fixed contours that enclose associated reflectivity cells are used to determine the 3-dimensional echo envelope for the reflectivity cell (or cells). Tangential shear and Doppler spread cells are likewise associated from scan-to-scan; associated with reflectivity cells (if possible); and identified with fixed contour envelopes. The lowest threshold fixed contour that encloses each of the reflectivity, shear, or spread cells is used to tag that cell to aid in the association processing.

A new set of attributes are developed for each volume cell. A list of these attributes are given in Table I for fixed contours and for reflectivity, shear, and spread cells. The attributes to be calculated for each volume cell are readily modified. The basic volume cell detection and tracking algorithm is used to perform the scan-to-scan association.

TABLE I

VOLUME CELL ATTRIBUTES

Fixed Contours	Reflectivity Peaks	Tangential Shear Peaks	Doppler Spread Peaks
Surface Area	Reflectivity at Peak	Shear at Peak	Spread at Peak
Echo Top	Height of Peak	Height of Peak	Height of Peak
Enclosed Volume	Height of Top	Height of Top	Height of Top
Centroid Location*	Height of Base	Height of Base	Height of Base
Total Surface Precipitation	Centroid Location*	Centroid Location*	Centroid Location*
Average Surface Rain Rate	Area at Peak	Area at Peak	Area at Peak
Average Reflectivity	Volume	Volume	Volume
Maximum Enclosed Peak Values	Area at Surface	Area at Surface	Area at Surface
Profile of Areas vs Centroid Heights	Reflectivity at Surface	Shear at Surface	Spread at Surface
Profile of Average Reflectivity vs Centroid Heights	Average Tangential Shear	Average Velocity Spread	Associated Reflectivity Peaks
Number of Enclosed Peaks (by type)	Average Radial Shear	Associated Reflectivity Peaks	Associated Shear Peaks
Nearest Neighbor Distances for Enclosed Cells	Average Vertical Shear	Associated Spread Peaks	
	Average Velocity Spread		
	Associated Shear Peaks		
	Associated Spread Peaks		

*Centroid Locations are Defined on the Surface Using Data from the Lowest Possible Elevation Angle

When data from two scans are associated, they can be used readily to calculate any desired attribute. The lists given in Table I are preliminary in nature covering the parameters we currently expect to be most important in subsequent analyses. Experience with the use of these programs for a larger data set will be required before a final set of attributes can be specified.

Experience with a larger data set is required as a prerequisite to the development of cell forecast algorithms. Crane (1976) processed reflectivity data from a number of radar scans obtained at Wallops Island during the summer of 1973 by the Johns Hopkins Applied Physics Laboratory (APL) in the process of initially establishing the utility of the peak referenced contouring technique. These data were used by Crane (1976) to investigate cell lifetime and possible cell tracking/extrapolation techniques. In this study, we used the same data set to determine the relative spacings between cells. The object of the spacing study was to determine if preferred spacings are evident in nature. If so, the preferred structure can be used to forecast the most probable location for new cell development. The ability to forecast locations for new cell development would add significantly to the 0-20 minute forecast because the median cell lifetime is less than 20 minutes and forecasting by extrapolation along a cell track is not adequate. An examination of the Wallops Island data revealed that the nearest neighbor distances between cells were between 7 and 9 km and that these distance values did not depend on the type of rain observed. This suggests that new cell site forecasts are feasible.

1.3 Software Development

The goal of this contract with the Air Force Geophysics Laboratory (AFGL) is to provide efficient computer software to obtain parameters to represent the essential information obtained in a sequence of scans of a single Doppler weather radar. The radar used to provide the data is the C-band Doppler radar operated by the Weather Radar Branch of AFGL at Sudbury, Massachusetts. The computer programs were prepared for the CDC-6600 at AFGL.

There are now three separate programs in the sequence of programs to be used for weather radar data processing. The first is the cell

detection program which was developed under the previous contract (Crane, 1977) and extensively modified during the course of this contract. The second is a plotting program used to display contours and cell centroids. This program was developed under the previous contract and modified under this contract to display separately the locations of the centroids of the fixed echo regions and the centroids for each of the peak detected cells - reflectivity, tangential shear, and Doppler spread cells. The third program detects and tracks volume cells. It was developed under this contract. This program uses data generated by the cell detection program to develop three-dimensional cells and to describe their location, height and intensity. The volume cell attributes are listed in Table 1.

The ultimate goal of this work will be the development of real-time radar processing techniques to be used on a dedicated computer system that is an integral part of the radar system. The programs generated to date on the current contract are exploratory in nature. They were designed to fit within the core storage limitations of the CDC-6600 computer but still have a high degree of flexibility in modifying storage array sizes and in providing auxilliary output for testing the program. The program design had real-time processing in mind and, in the end, should be reasonably efficient when tailored to an on-site computer system. Listing and operating instructions for the programs developed on this contract are included in the appendices.

1.4 Organization of the Report

A summary of the modifications to the cell detection program and plotting program is given in Section 2. A description of the volume cell detection program is given in Section 3. Initial consideration of the cell forecasting problem is given in Section 4. Sample outputs are provided in Section 5. Section 6 summarizes progress to date and provides recommendations.

2. IMPROVEMENTS TO THE CELL DETECTION PROGRAM

2.1 Cell Detection Logic Changes

The cell detection program was modified to include the detection of Doppler spread peaks and to pack integer addresses used in the peak detection routine six to a CDC word. The latter change was required to make room for the additional data used in Doppler spread processing. In the process of revising the address storage procedure, a number of minor logic errors were detected. These errors were associated with the operation of the radial-to-radial association of contours at different threshold levels (see Section 5.2 of Crane, 1977). The errors have been corrected and, in the process, changes were also made to streamline the storage of the temporary contour data.

At present, the temporary attribute storage array (TATR in subroutine PEAKD, see Appendix D) is used to identify active cells at each possible threshold level (relative to the peak level for the cell) and to store pointers to previously associated active cells as well as provide partial attribute summations for the active cells. The TATR array is doubly subscripted maintaining temporary storage for the number identification of the peak for the active cells. For each active cell the stored data includes the current estimate of the peak value; a set of partially summed attribute values for each of the nested contours for each possible threshold level below the peak, area, average value, centroid location plus, for reflectivity cells, Doppler spread, radial shear, tangential shear, and radial velocity; the azimuth count for the last azimuth on which the attributes for each contour were updated; and a pointer to the enclosing fixed contour. This last item is included for later use in the volume cell detection program. If a cell is not active at a particular threshold level but was previously active on the current radial, the area attribute contains a pointer to the cell, now active at that level. After processing the data for a radial the cell-to-cell pointers are zeroed. If a cell becomes inactive, all pointers to that cell are also zeroed before processing data for the next radial.

The program as it now sands is configured to allow rapid changes in the dimensions of all the storage arrays. This convenience costs in

producing relatively longer processing times than for a program with fixed storage allocations. A final program modification should be made when the exploratory runs of the computer program are finished to fix the array sizes and optimize the program for rapid operation.

2.2 Refinements in Velocity Data Processing

The program was modified to provide automatic resolution of Doppler velocity ambiguities. The first detected velocity data for each scan is assumed to be in the velocity interval spanning zero velocity. Successive observations at different but adjacent range or azimuth locations are assumed to differ from the first observation by less than the velocity ambiguity. If the difference is larger, it is adjusted so that it is smaller by adding or subtracting a value equal to the velocity ambiguity ($\lambda/2 \cdot PRF$ where λ is the wavelength and PRF is the pulse repetition frequency). The data for each radial are then reexamined to ensure that each velocity observation differs from the average of the velocity values for the two surrounding range intervals by less than the velocity ambiguity and adjusted again if required.

The above processing is used for contiguous range and azimuth elements. If large spacings exist between regions of radar data above the processing threshold, the first data point in one region is compared with the average velocity for the previous region. The data therefore are objectively adjusted to remove ambiguities. Provision is provided to reject data from this analysis if the Doppler spread is not within preset bounds but this option has not been exercised.

The processed data appear to be reasonably smoothly varying as indicated in Figure 1. The tangential shear data obtained by numerically differentiating the radial velocity data are however, more variable as illustrated in the figure. The apparent noise evident in the tangential shear field led to the inclusion of Doppler spread data in the analysis process. The program was also modified to introduce a new constant to specify the quantization interval for peak detection contouring. By setting this constant, additional control is exercised over the peak detection process. Referring to Figure 1, no peaks would be detected if the quantization step is 1 m/s but a number of peaks are detected for a 0.1 m/s quantization step (see Section 5).

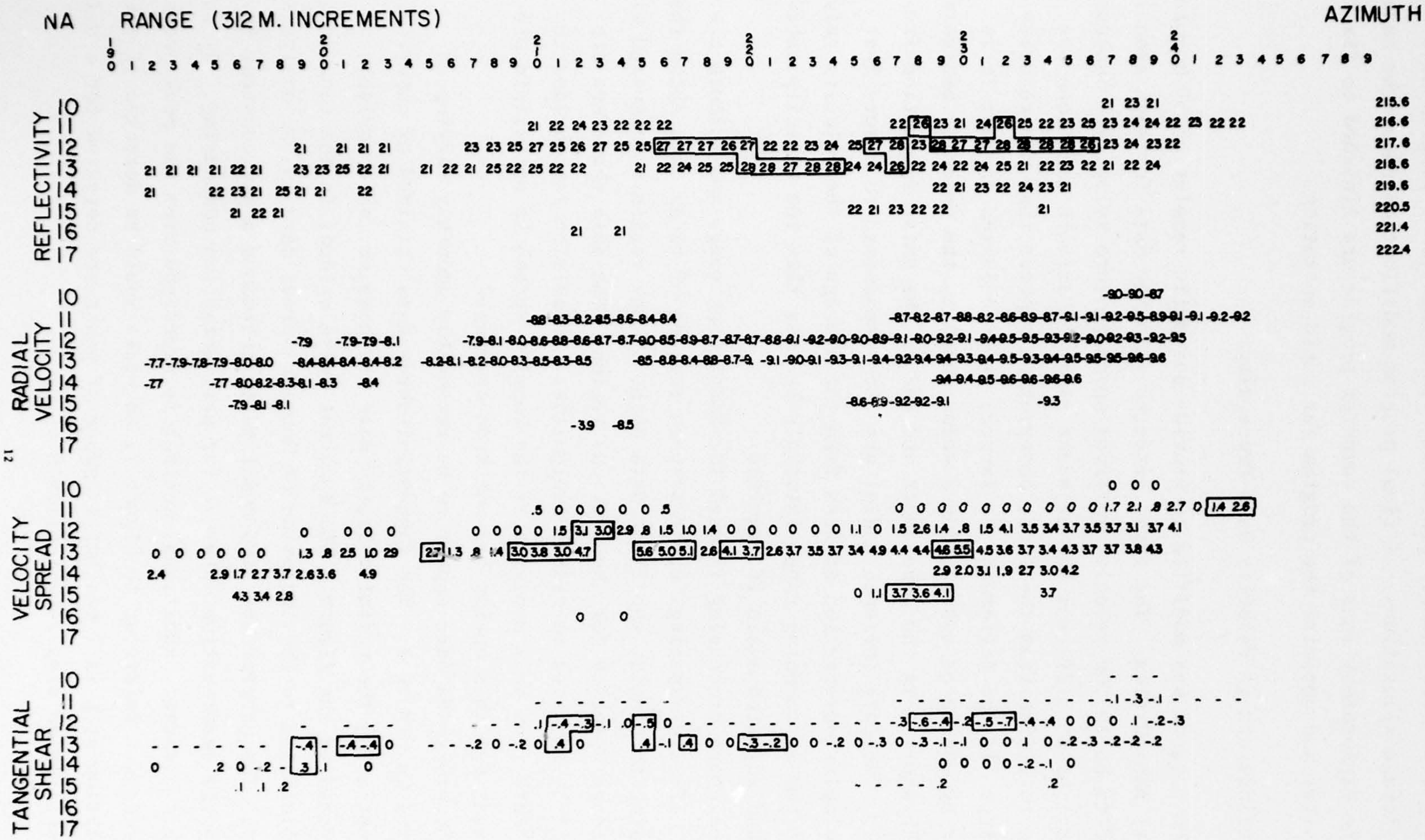


Figure 1 Sample Data Set Including Two Fixed Contour Echo Areas and Three Reflectivity Peaks

2.3 Doppler Spread Processing

Velocity variance data may now be routinely processed using the computer program. Facilities to analyze this data field were added because of the apparently high noise levels in the tangential shear data and the expectation that at high signal-to-noise ratios, the spread data may be more reliable. As discussed before (Crane, 1977), the spread data are assumed to contain the same information as the tangential shear data due to the dominant effect of velocity fluctuations on the scale of the antenna beamwidth at the observation range. Both data fields are now processed to allow an intercomparison between the information available from each field and to investigate their relative sensitivity to noise.

The velocity variance output from the pulse pair processor is known to be adversely affected by low signal-to-noise ratios. A noise level dependent threshold parameter is provided for thresholding the velocity variance data but has not been exercised as yet. To reduce the sensitivity of the variance data due to noise, the square root of the variance is used for analysis of the Doppler spread. A sample of this data is depicted in Figure 1. It is noted that the velocity data, radial velocity, Doppler spread, and tangential shear, are processed only when the reflectivity values are above the lowest (processing) threshold level which, for this figure, is 20 dBZ. High Doppler spreads are evident in two regions of the figure, (1) at low reflectivity values and (2) at high reflectivity values. The high spreads at low values are presumably caused by signal-to-noise problems and should be suppressed using the signal-to-noise threshold level. The high values corresponding to the higher reflectivity values are presumably real, although the correlation with the tangential shear values is not good for the data in this figure. A larger data sample must be analyzed to optimize the processing of tangential shear and/or Doppler spread data.

Modifications for Doppler spread processing were made in several areas of the program. The largest change included the addition of temporary attribute storage arrays for the detection of Doppler spread peaks. In addition, the reflectivity peak and tangential shear peak detection algorithms were changed to increase the number of attributes so the average Doppler spread within a detected cell could be determined. This attribute is now listed with the others as described in Section 5.

3. VOLUME CELL DETECTION AND TRACKING

3.1 Definition of a Volume Cell

The cell detection program provides, as one of its outputs, a list of attributes for fixed contours, reflectivity peaks, tangential shear peaks, and Doppler spread peaks. At a minimum, each attribute list defines the average value, area, and centroid location of each cell for each azimuth scan of an elevation scan sequence. The expected scan sequence for the radar includes azimuth scans (or azimuth sectors in a raster scan) at successively higher elevation angles until a complete volume scan is completed. The data for each elevation or tilt of the scan sequence must be combined with the data from other tilts to provide a three-dimensional picture of each cell or echo volume.

The process of combining data from scan to scan in a volume scan sequence is illustrated schematically in Figure 2. This figure represents a height section through three cells. The contours represent quantized data (e.g. reflectivity data in 1 dB steps) that have been processed on each azimuth scan to produce a set of reflectivity peak cells. The minimum attribute set is identified by the length of the heavy bar (detected length or in three-dimensions, the cell area) and its location (centroid) on each tilt. The data obtained for the lowest tilt is assumed to extend to the surface. The height of the centroid is determined from the range to the centroid and the elevation angle for the scan.

The three-dimensional cell or volume cell is defined by the volume enclosed within the peak detected cells that are associated from scan-to-scan. A criterion similar to the one used to define a peak referenced cell is used to define the volume cell. From the sequence of attributes for cells detected scan-to-scan, cells 1, 2 and 3 on this figure, a peak value and its height may be selected. The top and base of the volume cell are defined by the height at which the reported average value drops the required number of quantization units below the peak value. This height is determined by extrapolation if detected cells are obtained for each tilt or is taken as halfway between the height of a value above the required threshold and the expected height of the intersection of the cell with the next tilt plane if no associated cell was detected on the next scan. The locations of the peaks, tops, and bases are depicted on the

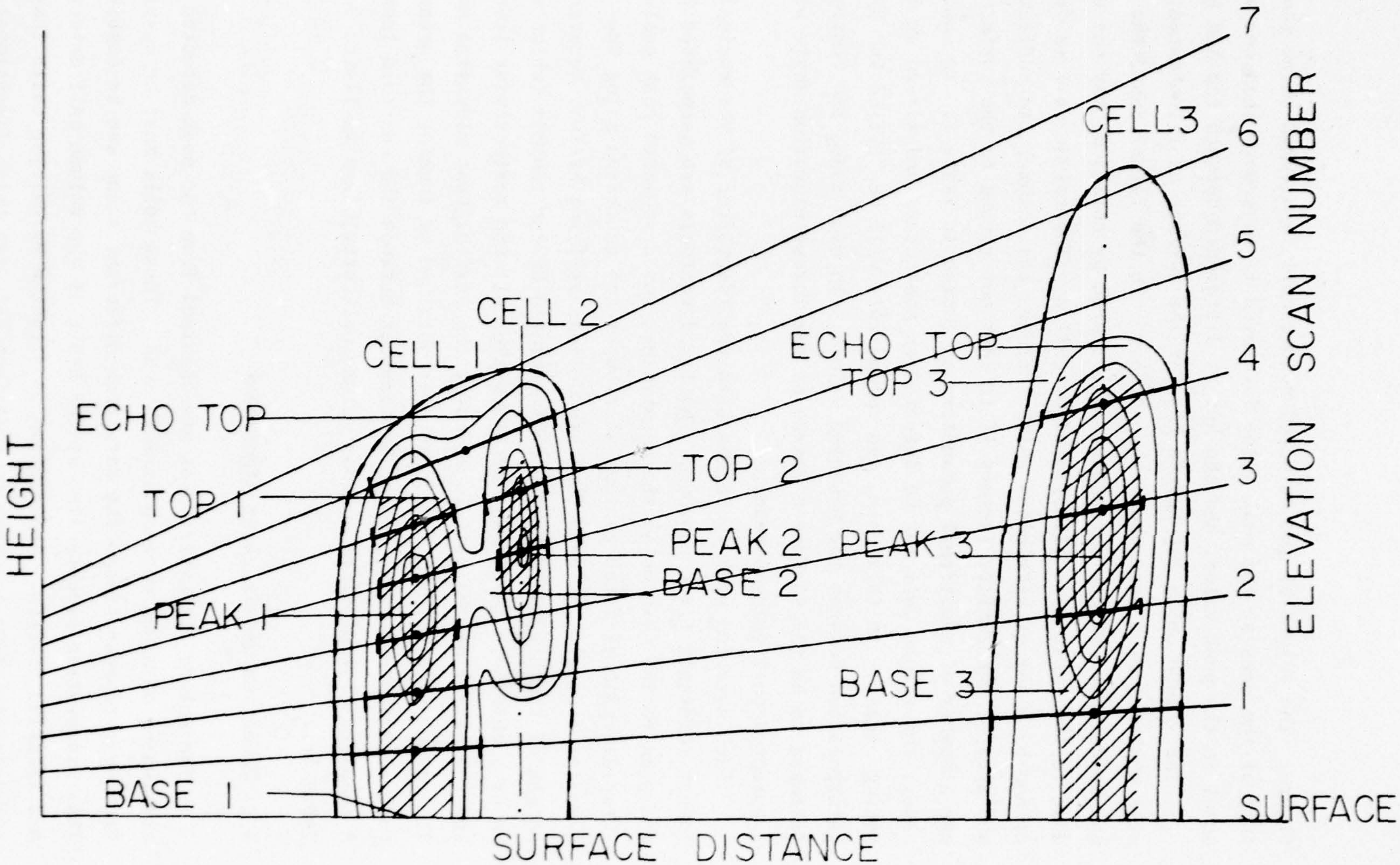


Figure 2 Illustration of Scan-to-Scan Data Association in a Volume Scan Sequence

figure. The volume of the detected volume cell is assumed to be the product of the area at the peak value (averaged if have more than one value equal to the peak value) and the height difference between top and base.

The volume cells may have a base at the surface as illustrated by cell number 1 or a base above the surface. In the latter case, the cell may be detected at the surface as illustrated by cell 3 or may not extend down to the surface as illustrated by cell 2. The volume cell is described by a set of attributes which includes its volume, its reflectivity and area at the surface (zeroes if it does not extend to the surface) and a number of additional parameters as listed in Table I. In some cases, the volume cell may be detected on some scans and missed on intervening scans. In this case, the volume cell will be "filled in" by interpolation between the measured values. In each case, the centroid is taken to be the surface distance at the lowest elevation angle with a detected cell (single scan).

Each detected peak is tagged with the identifier of the enclosing lowest threshold fixed contour. The fixed contours are associated from one scan to the next using the identifiers for associated peak cells. Three-dimensional fixed contour attributes are generated using the associated data. The echo tops are defined as lying halfway between the height of the highest detected peak enclosed by the contour (which may be at a threshold level many dB below the cell top reflectivity level) and the height of the cell location at the next highest elevation angle. The volume within the fixed contour is obtained by summing the areas on each scan and using the height differences between the centroid locations. A complete list of fixed contour volume cell attributes is listed in Table I.

3.2 Detection and Tracking Algorithms

The volume cell attributes are obtained from the peak detected cell attributes obtained on each azimuth scan. These cells must be associated from scan-to-scan before the data from different scans can be combined. This association process lies at the heart of the volume cell detection and tracking process. Association is affected by pairing cells that are sufficiently close together to come from the same three-dimensional structure. The location of the contours surrounding each peak is not available

for use by the association algorithm. Association is accomplished by first selecting cells from each scan whose centroid locations, when projected on the surface, are separated by less than the square root of the combined areas, plus the distance the cell might move during the interval between scans, plus a fixed distance to account for the statistical centroid location uncertainty introduced by the expected variability of the radar data. Comparison is always made between the cell location for a particular scan and the detected volume cell location from the lowest elevation scan on which it was observed.

In most cases, only pairs of cells will be evident from the association algorithm listed above. Occasionally, in a cluster of cells, more than one cell may meet the association criterion. In this case, the cells will be associated by picking those cells which are closest after a uniform offset is made between cell locations to provide the largest number of associations. This is illustrated in Figure 3. In this figure, the cell to be tested, cell A, is closest to the previously detected volume cell number 2, but after translation of the surface locations *relative to each other* by the amount shown by the straight line on the figure, all three cells (lettered) may be associated with the detected cells (numbered) with smaller physical separations. This procedure for conflict resolution (correlation) will be used only when the resultant translation is physically realizable (i.e. corresponds to a possible cell tilt or translation velocity).

The scan-to-scan cell association logic is also used for volume-to-volume scan sequence association for cell tracking. For the tracking problem, the translation analysis for conflict resolution becomes more important and guidance in selecting the appropriate translations is taken either from a prescribed wind vector (700 mb wind for instance) or from the results from the previous scan. The conflict resolution or correlation algorithm is performed separately for large echo regions in that the translation values are allowed to vary from one echo region to the next.

3.3 Volume Cell Attributes

The volume cell attributes were partially defined in Section 3.1 and are listed in Table 1. A different set of attributes is generated for

+ surface location detected volume cell

● surface projection of peak cell

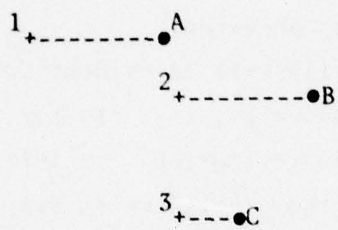


Figure 3 Illustration of Scan-to-Scan Association for Volume Cell Detection and Tracking

each volume cell type. Fixed contour attributes include measurements of the total precipitation produced within the echo region, average rain rates on the surface, profiles of area and of average reflectivity for the data contained within the fixed contour envelope, and summaries of the numbers and locations of peak referenced cells detected within the echo envelope. The peak referenced volume cell attributes include the size, intensity, and location parameters listed above plus information on associated volume cells of different types. The reflectivity peak attributes also include average spread and shear values for data obtained within the cell (between base and top). The vertical shear values are calculated using the variation of the average radial velocity with height.

Each detected volume cell is characterized by its attributes. Each volume cell track by the time variation of its attributes. In addition, tracks may be characterized by a lifetime and average velocity. Observations obtained to date indicate that the individual peak referenced reflectivity cells neither merge nor split but only develop and translate. Observations of a much larger data set are needed to verify this model for small cell behavior. The larger fixed contour regions may merge or split depending upon its stage of development. By tracking the enclosed cells and maintaining the cell to fixed contour identification relationship, the merger, growth, division and decay of the larger echo regions may be automatically taken into account. The morphology of the echo development process may be important to the understanding of precipitation dynamics, however, suitable attributes to characterize the relevant processes have yet to be defined. Again, experience with a significantly larger data set is required before further progress can be made.

3.4 Software for Volume Cell Detection and Tracking

A computer program (TRACK) was generated under this contract to associate cells from scan-to-scan, resolve conflicts between multiple associations and generate the volume cell attributes listed in Table I. The listing is provided in Appendix D and operating instructions are given in Appendix C. The program processes data which have been generated by the cell detection program (EXTRAD) and then recorded on disk or tape; the algorithms described in Sections 3.1 to 3.3 are used. The current output is a list of attributes for each detected volume cell (or

track). These outputs are again stored on disk or tape and listed on printout for subsequent analysis. Programs have not been generated as yet to summarize the track histories, do climatological analysis, or provide samples for case study analysis.

4. CELL FORECASTING

4.1 Extrapolation Along Cell Tracks

Short range, 0-20 minute, forecasts are of importance for severe weather warning and weather hazard avoidance. The objective of a forecast on this time (and by implication comparatively small distance) scale is the occurrence of a severe event at a point or over a small area such as an airport or the approach path to the airport. Events such as high winds produced by downbursts or by gust fronts, or regions of intense hail fall are of most interest. Larger time and area forecasts may be made of the probable occurrence of a severe weather event but the problem considered here is the remote detection, tracking, and prediction of the development and decay of a severe weather event. The first parts of the problem, the detection and tracking of small scale features in the radar data, were considered in previous sections. The association of these features with severe weather events is a second problem that is not being considered under this contract. The third part, the forecast of cell development and motion are given initial consideration in this section.

The short range forecast problem considered here is different from most meteorological forecast problems in that the occurrence of at least one cell is assumed. The problems are where will it move, how will it develop in time, where will new ones develop, and will it produce a severe weather event. The measure of success of the forecast procedure must depend upon the particular problem addressed. The success of a cell position forecast should be measured by the distance between its actual position and forecast position at forecast time. The success of the cell development forecast should be measured by the difference between the actual intensity (reflectivity, say) and forecast intensity at forecast time. Classical evaluation procedures that test the occurrence or nonoccurrence of the event at a number of geographical locations are not recommended in that the reason for failure of the forecast may not be readily apparent.

Crane (1976) used data obtained by APL at Wallops Island to perform some initial tests of cell tracking/track position forecast algorithms. He assumed that a single cell motion vector would adequately describe the

propagation of a field of cells and tested that assumption by measuring the along track and cross track position errors as a function of forecast time (0-20 minutes). His results showed that the forecast error (position) was the order of the cell diameter (median value) at the half life (median lifetime) of the cell. He also found that the half life was of the order of 10 to 15 minutes and the median cell diameter was of the order of 3 km. This result was, however, based on a limited amount of data.

Crane found that the operation of the track extrapolation forecast procedure could be improved by using different motion vectors for different regions of the display area (see Figure 4 for an example showing the different directions possible for cell tracks observed during the same time interval). This idea is incorporated in the volume cell detection and tracking program. The major problem of using extrapolation along a track for forecasting is the relatively short lifetime of most cells. The largest and most intense cells persisted for a relatively long time, 40 to 50 minutes. Except for these cells, the cell could disappear by forecast time and a significant number of new cells could appear. Forecasts based upon cell time histories could be used to estimate cell lifetime but the forecast of new cell site development is a major problem for any radar data based short range forecast procedure.

4.2 New Cell Site Development

The requirement for a procedure to forecast the most probable sites for new cell development and the observation of a seemingly persistant organization or structure for the location of active cells lead to an investigation of the most probable distance or spacing between the cells. The Wallops Island data previously processed by Crane (1976) were used for this analysis. The data consisted of computer prepared maps of detected cell locations for each of the azimuth scans processed from the 1973 summer data set provided by APL. Nearest neighbor distances were obtained from the data to investigate the existence of persistant dominant scales for cell organization. The smallest, second and third shortest distances between each cell and its neighbors were determined and tabulated for each cell for each available volume scan. It is noted that with the processing technique used, the distance between two closely spaced cells is counted twice, each cell being the nearest neighbor of the other. Nearest

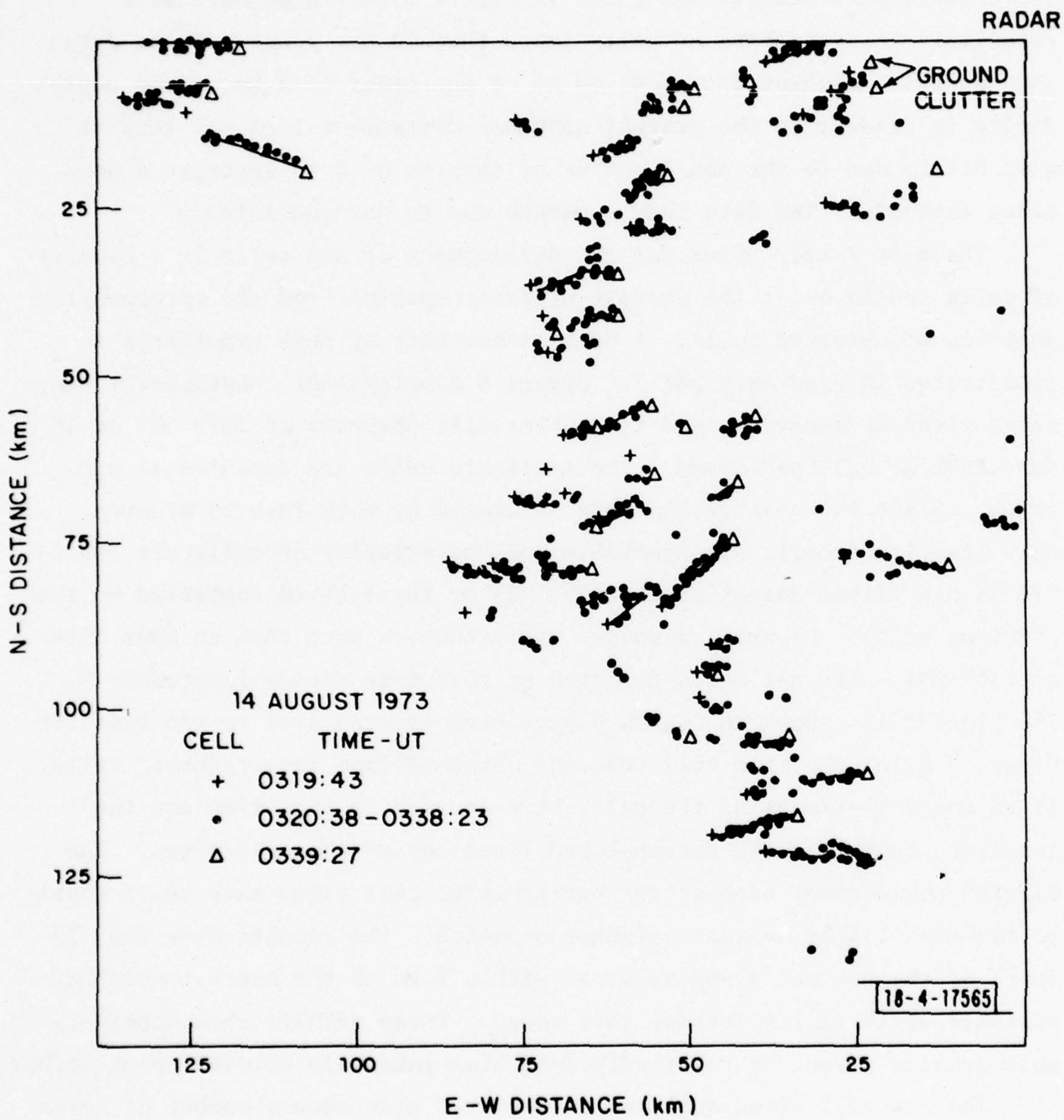


Figure 4 Cell Tracks for a 20-minute Interval Observed by the Wallops Island SPANDAR Radar (from Crane, 1976)

neighbor distributions were generated for each scan. The mode for each distribution was used to estimate the most probable cell spacing for that scan. Time histories of the modal values for the smallest, second and third shortest distances are given in Figure 5 for three days with relatively large numbers of cells (more than 20 per scan). These data show nearest neighbor distances to be on the order of 8 km. Some periodicity is evident in the nearest neighbor distance values but this is most likely due to the small number of samples used to generate a distance estimate. The data show a marked day to day consistency.

The most likely sites for the development of new cells in a cluster of cells should be at the nearest neighbor spacing from the extrapolated position of observed cells. A preliminary test of this hypothesis is illustrated in Figures 6 and 7. Figure 6 displays the locations of new, short-lived or decaying, and trackable cells observed at 2229 GMT on 18 June 1973 at Wallops Island. The trackable cells are depicted at mid-track. Since the observations are separated by more than 20 minutes, only long-lived cells are trackable and the majority of cells are depicted as new (first detection at 2229 GMT) or short-lived (detected on the previous scan). Figure 7 displays the situation more than an hour later, at 2337 GMT. The new cells depicted at this time are designated by N. The older cells shown on Figure 6 have been extrapolated to the time for Figure 7 using the mean cell velocity obtained from the trackable cells. It is noted that most of the cells have decayed by this time and the locations represent the extrapolated locations of the cell sites. The circles drawn about each of the extrapolated cell sites have radii equal to the most likely nearest neighbor distance. The results show that 23 (66%) of the new cells appear at or within 2 km of the nearest neighbor distance while 12 lie outside this range. These results show considerable promise given the relatively long time intervals between observations.

The new cell sites depicted on Figure 7 also show a number of cells approximately spaced from each other by the nearest neighbor distance but not connected to an older cell site. A forecast based upon a more complex pattern using the nearest neighbor distances in a more regular extended structure may be capable of predicting the locations of a larger number of cells. The structure may also reduce the size of the region

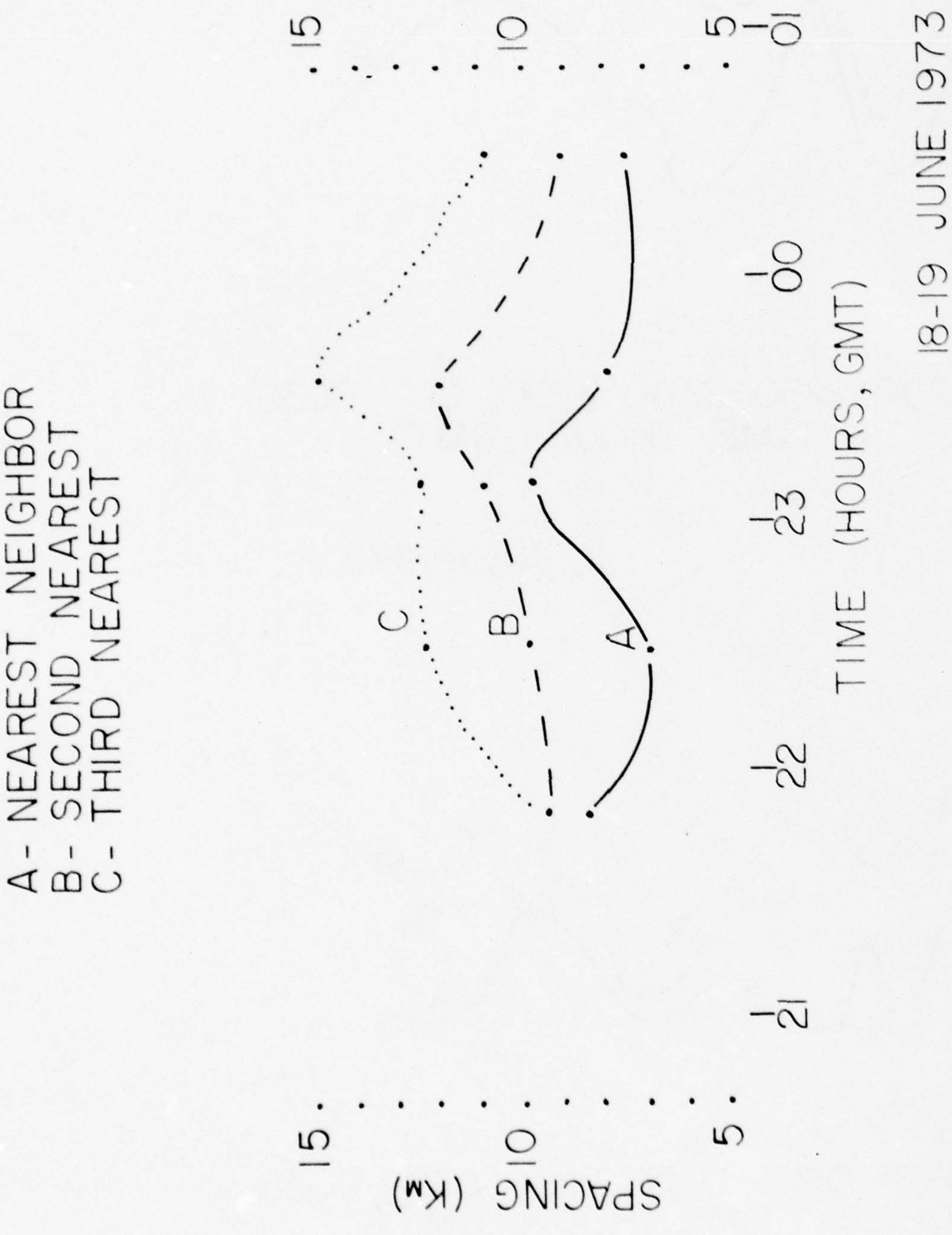
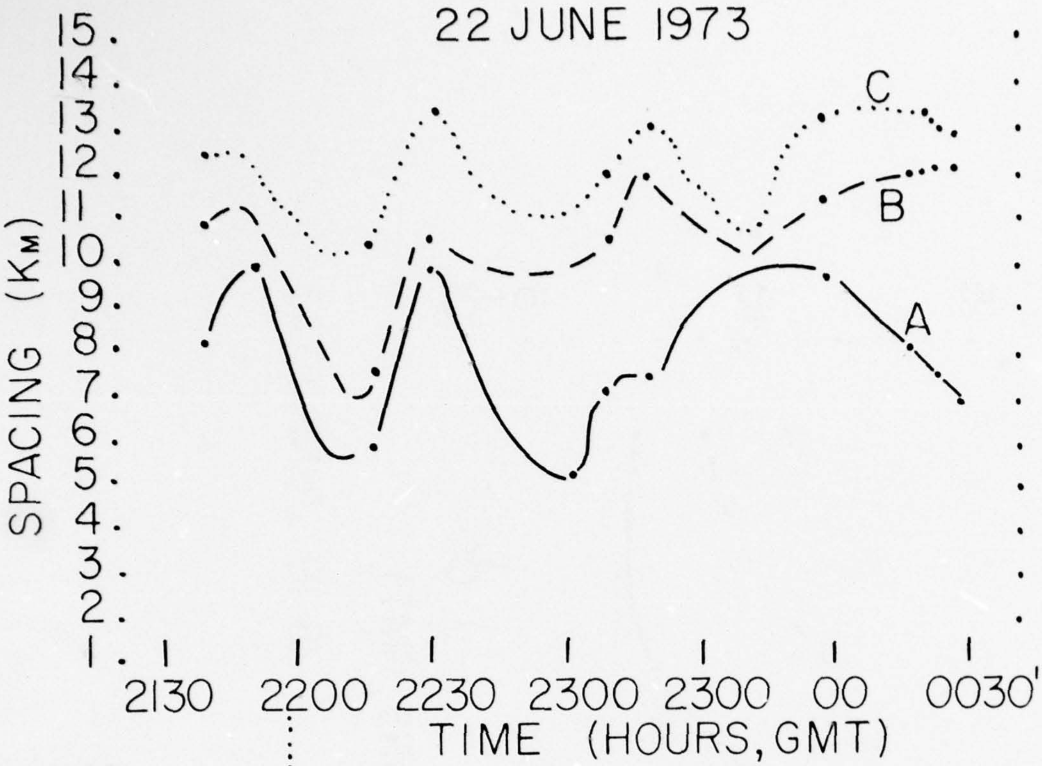


Figure 5 Nearest Neighbor Distances



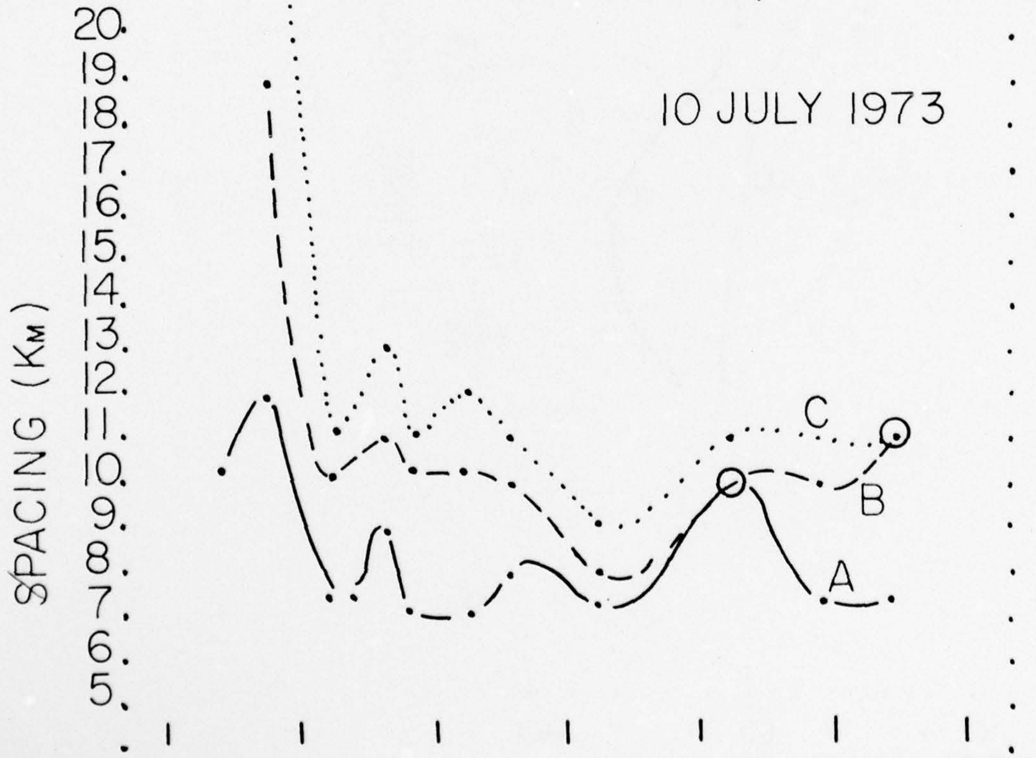


Figure 5 (cont) Nearest Neighbor Distances

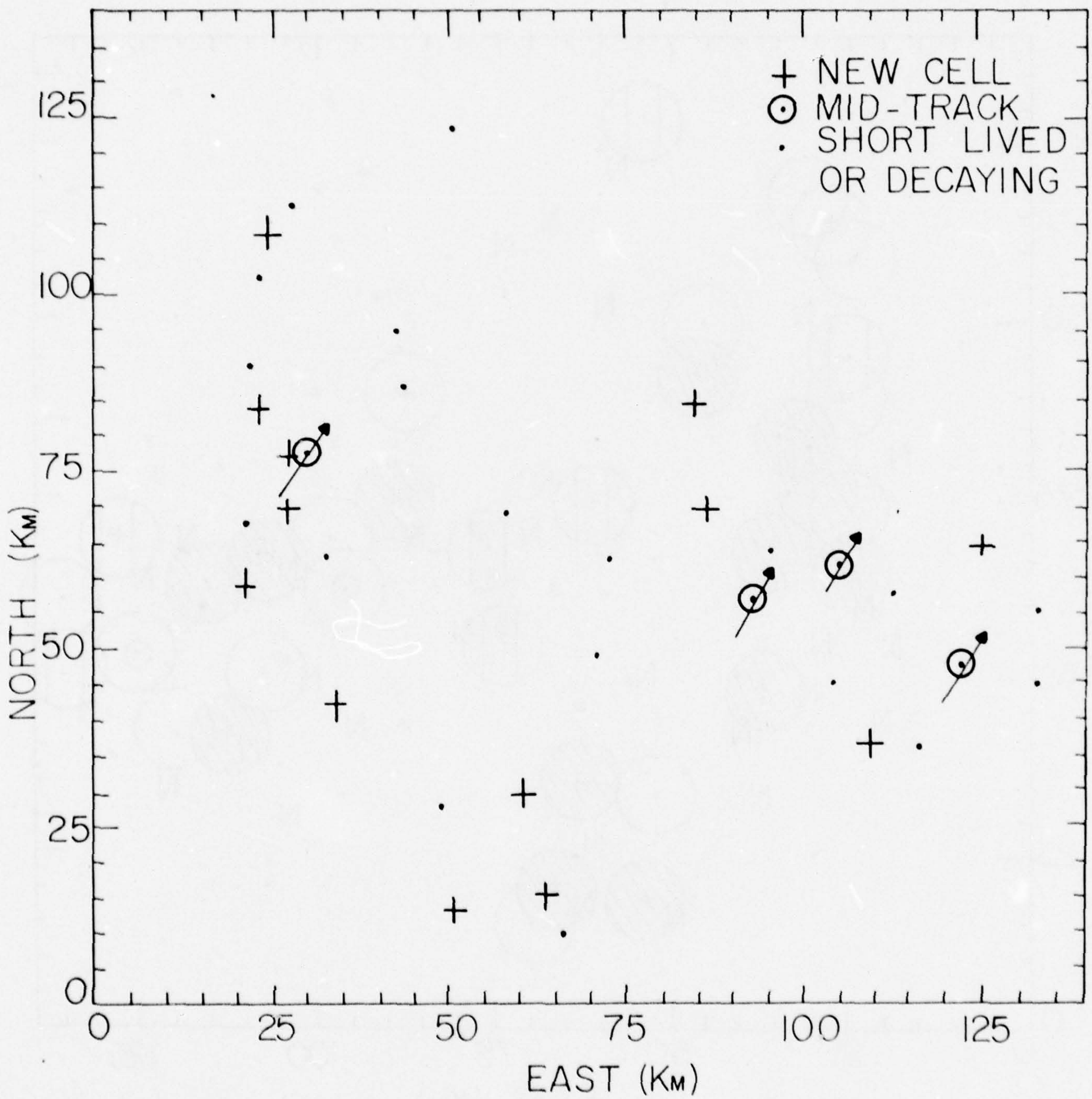


Figure 6 Cell Locations at 2229 GMT, 18 June 1973 at Wallops Island

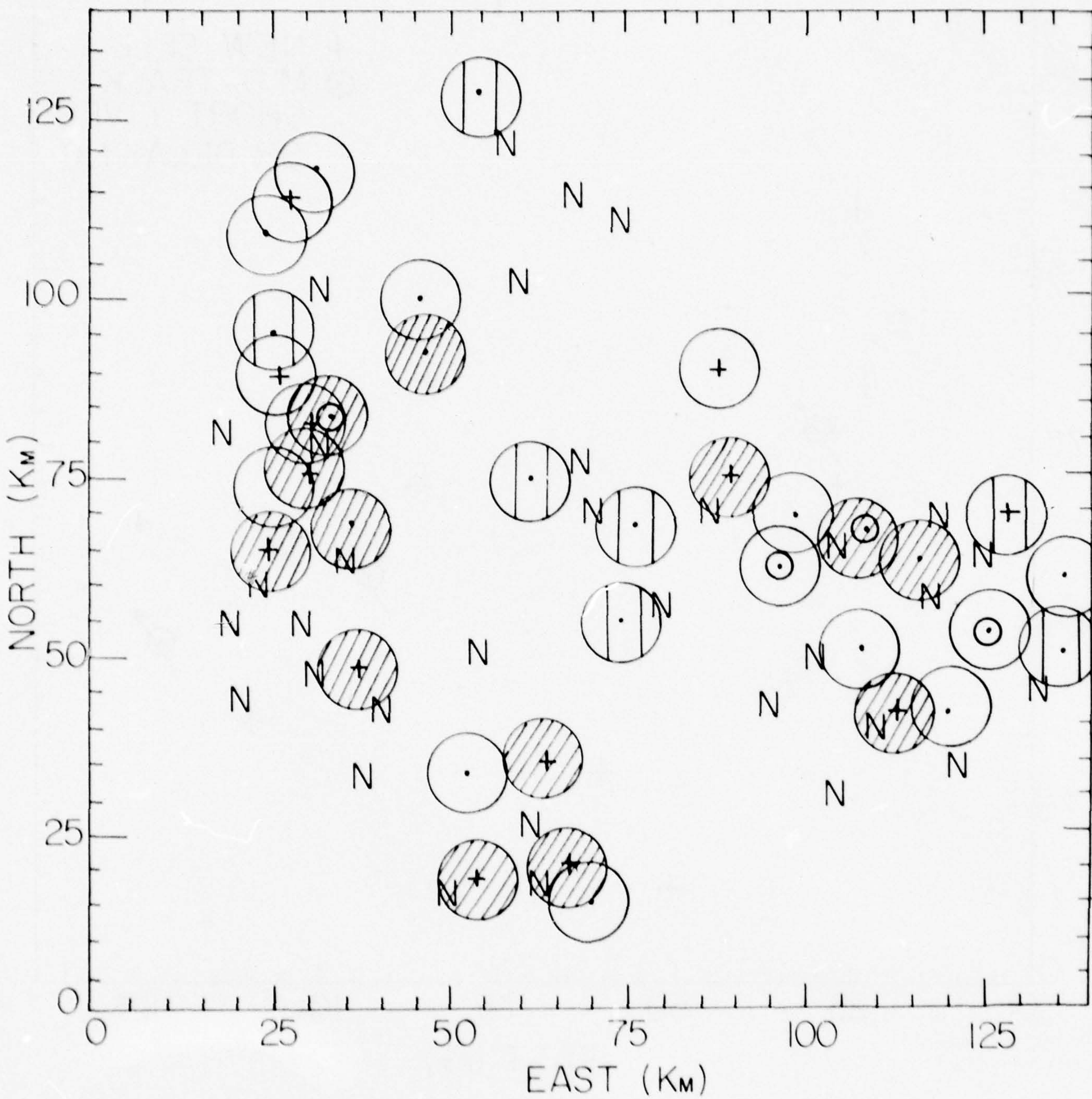


Figure 7 Cell Locations at 2337 GMT, 18 June 1973 at Wallops Island

forecast for probable new cell development by specifying a segment or segments of the nearest neighbor arc. A considerably larger sample of data with smaller time steps between observations is required before a procedure for new cell site forecasting can be developed and tested. The preliminary results presented here are encouraging and indicate that a new cell site forecasting procedure can be developed.

5. ANALYSIS OF SELECTED DATA SETS

5.1 Use of the Computer Programs

The computer programs described above were developed as a prototype for a real-time processing system to be employed in reducing the number of data bits required to describe a set of radar observations. The objective of the program was to replace the large volumes of data obtained by a radar system to a set of fixed contour and peak referenced cell attributes capable of representing the same essential information. A prototype program is now available with optional choices for many of the processing parameters and for representing the cell and contour attributes. The major thrust of this contract has been program development and initial testing of critical hypotheses such as the possibility of forecasting the locations of new cell sites. A considerable amount of work still remains using the programs to optimize the processing parameters.

An example of the input radar data for a pair of fixed contours is given in Figure 1. The raw data are the three input parameters, reflectivity, radial velocity, and Doppler (or velocity) spread. An internally generated data field, tangential shear, is also depicted. Contoured data for the three fields used in further processing for one of the echo regions are depicted in Figure 8. In this figure, the quantization steps for each data field are 1 dB, 0.5 m/s, and 0.1 m/s/km for the reflectivity, spread, and tangential shear fields respectively. The reflectivity data show relatively long, thin contours. The basic resolution element for processing, 1° by 0.3 km, is a square on this figure. For more efficient processing, the resolution elements should be adjusted so the contours to be detected are nearly circular. The radar data are read into the computer in 1° by 0.15 km resolution elements. In this example, the data along a radial should be averaged by at least a factor of 6 (3 times the factor used for this figure) to produce 1° x 0.9 km resolution elements. This adjustment may be made automatically in the cell detection program. The spread and tangential shear data show large changes from one resolution element to the next although, with the quantization steps used, the data reveal the same tendency toward elongation as the reflectivity data.

Contours enclosing peak detected cells are indicated by the cross hatching on Figure 8 and on Figure 9. The contours are generated at

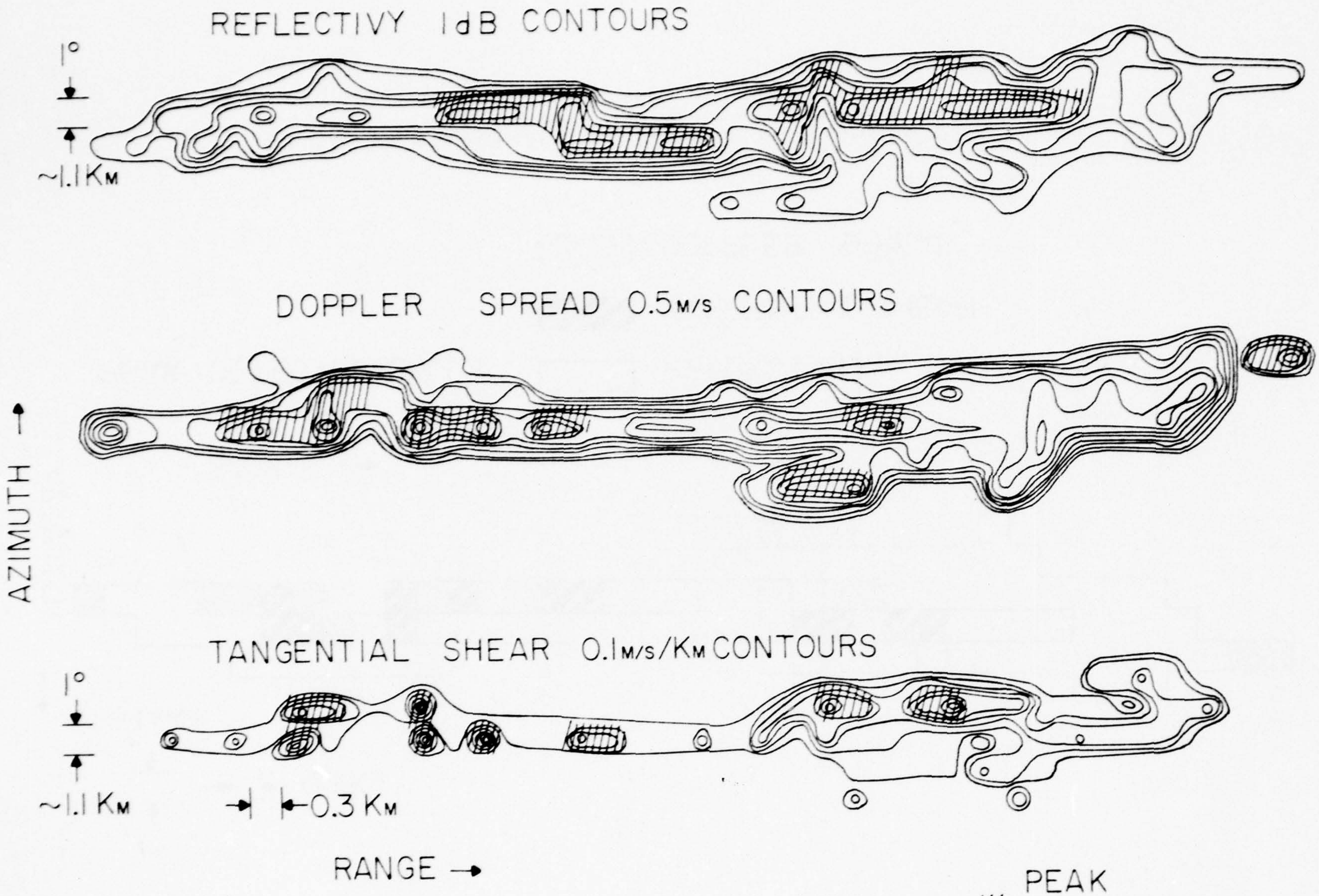


Figure 8 Contoured Data from the Sample Set Depicted in Figure 1

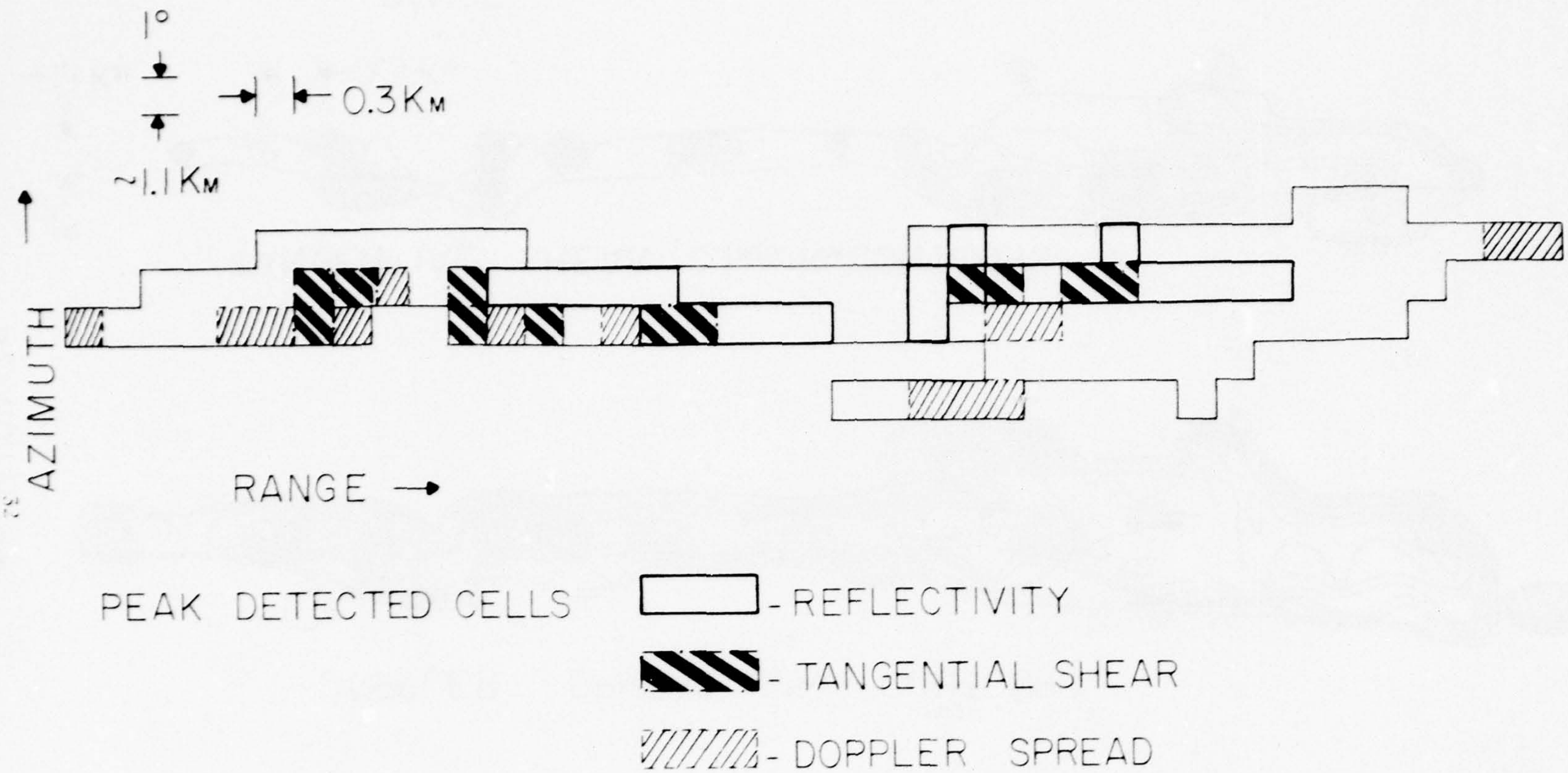


Figure 9 Composite of Fixed Contour Echo and Detected Reflectivity, Tangential Shear, and Doppler Spread Peaks for the Data Depicted in Figure 8

three quantization units below the peak values. The outer contour for reflectivity on Figure 8 and the outer contour on Figure 9 correspond to the 20 dBZ threshold used for processing. Two reflectivity peaks were detected although a shoulder on the first peak (in range, the shoulder is at shorter ranges) would have been detected as an individual cell if two quantization steps were used to define the cell. The shoulder would also be included with the two detected cells in a single cell if the 1° by 0.9 km resolution area were used.

The tangential shear and Doppler spread peaks are shown superimposed on the reflectivity contours in Figure 9. The two tangential shear peaks occur for each reflectivity peak if the shoulder were included. These peaks together with the reflectivity data appear to be delineating the updraft, down draft structure of the cell. With a change to a 1° by 0.9 km resolution area, these sub-cell structures would be averaged to a consistent, one cell picture for this echo region. The Doppler spread data reveal two types of peaks, four of the seven detected peaks coincide with the tangential shear peaks outlining regions of high shear and high spread. These peaks are also intimately related to the reflectivity structure. Three other Doppler spread peaks also are evident at the very edges of the 20 dBZ contour. These peaks correspond to regions of relatively low reflectivity (23 dBZ and lower) and austensibly represent regions where low signal-to-noise values give rise to deceptively high Doppler spreads.

The number and shapes of the peak referenced cells will vary as the quantization step size, the number of quantization steps for peak detection, and the size of the resolution area are changed. More experience is required using these computer programs to select the optimum combination of these parameters for the detection of physically meaningful cells. As used in generating Figures 8 and 9, it appears that too much detail is present and some of the detected regions especially for spread and tangential shear data represent structure on too small a scale (for example, the individual updraft and downdraft regions within a cell).

5.2 Volume Cell Observations

The volume cell detection program is used to combine the data from a number of individual azimuth scans. Data obtained from the Sudbury radar, subsequent to 1928 GMT on August 13, 1975 using 1° by 0.9 km

resolution areas are depicted in Figures 10-14. These data show the centroid location of each reflectivity peak referenced cell coded both by average reflectivity and by area. The locations of the tangential shear peaks are denoted by X and the locations of Doppler spread peaks are denoted by +.

The data from each of the scans were combined to form volume cells shown in Figure 15. In this figure, the solid lines connect the cell locations as detected on each scan using the algorithms described in SEction 3 (Track Program). Cells within 50 km of the radar were detected at elevation angles up to 5°; cells at further ranges were only detected at elevation angles below 4° (heights less than 5 km). A limited set of volume cell attributes for this data set is listed in Table 2.

Figure 10   Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 1° Elevation Angle

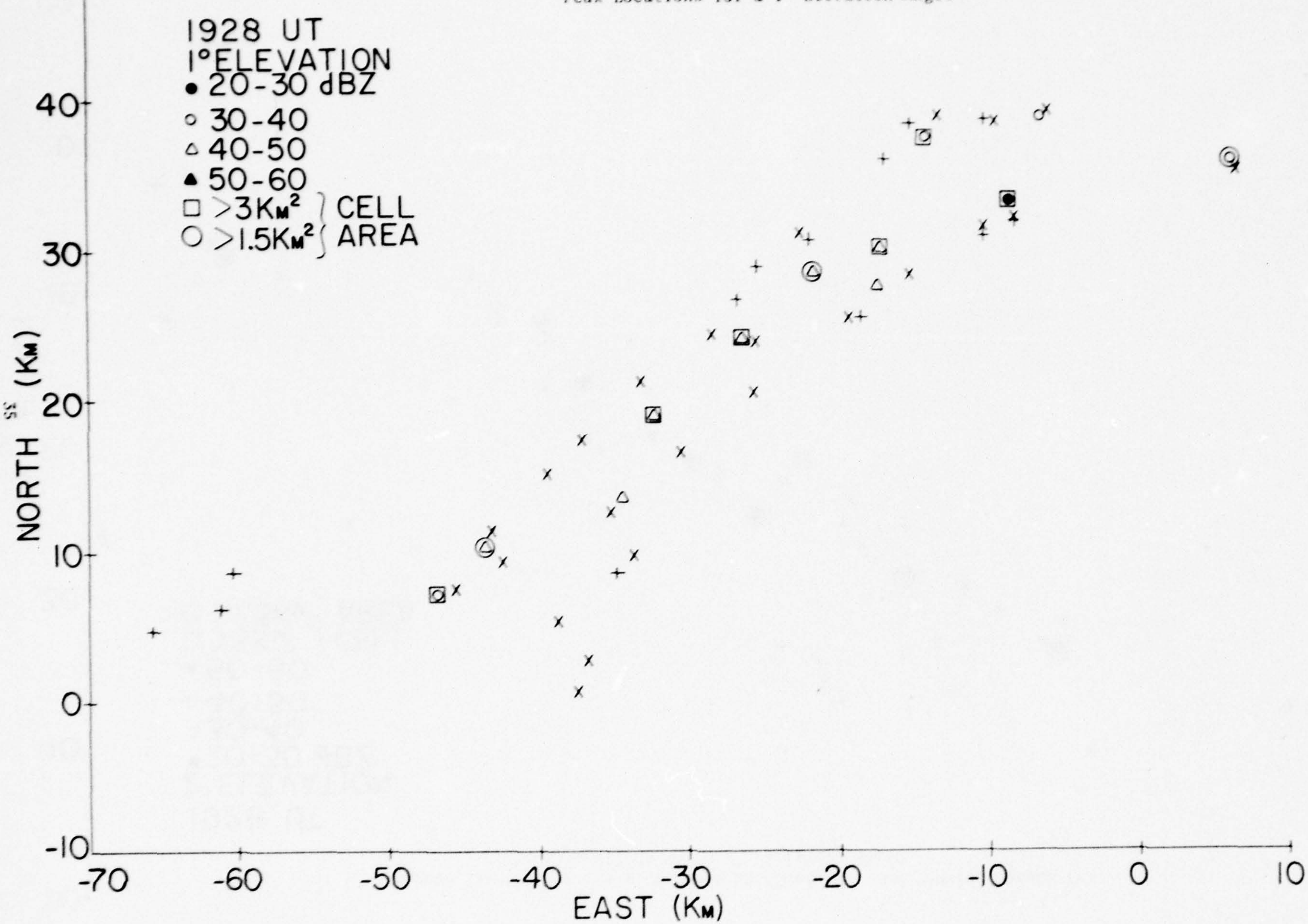
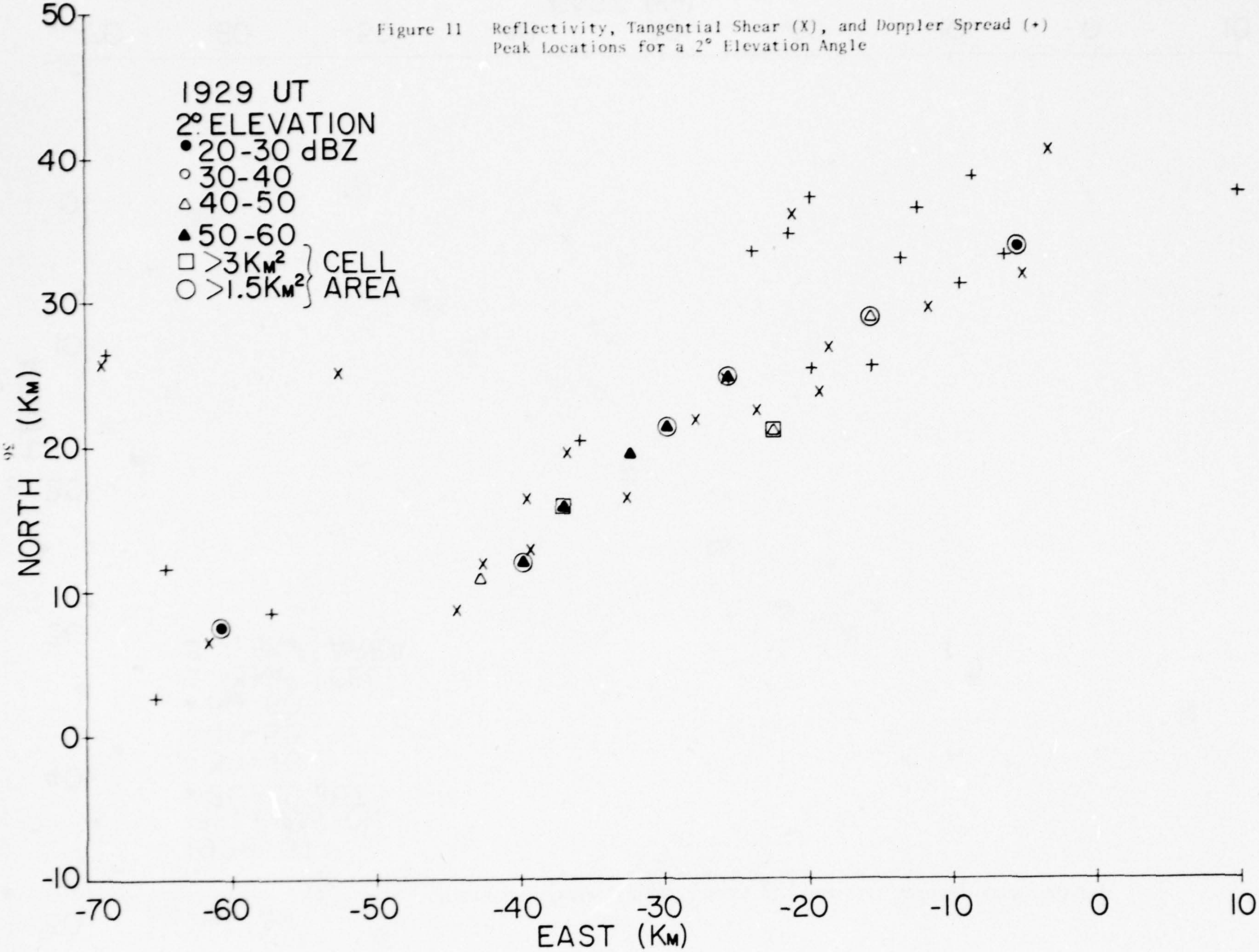


Figure 11 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 2° Elevation Angle



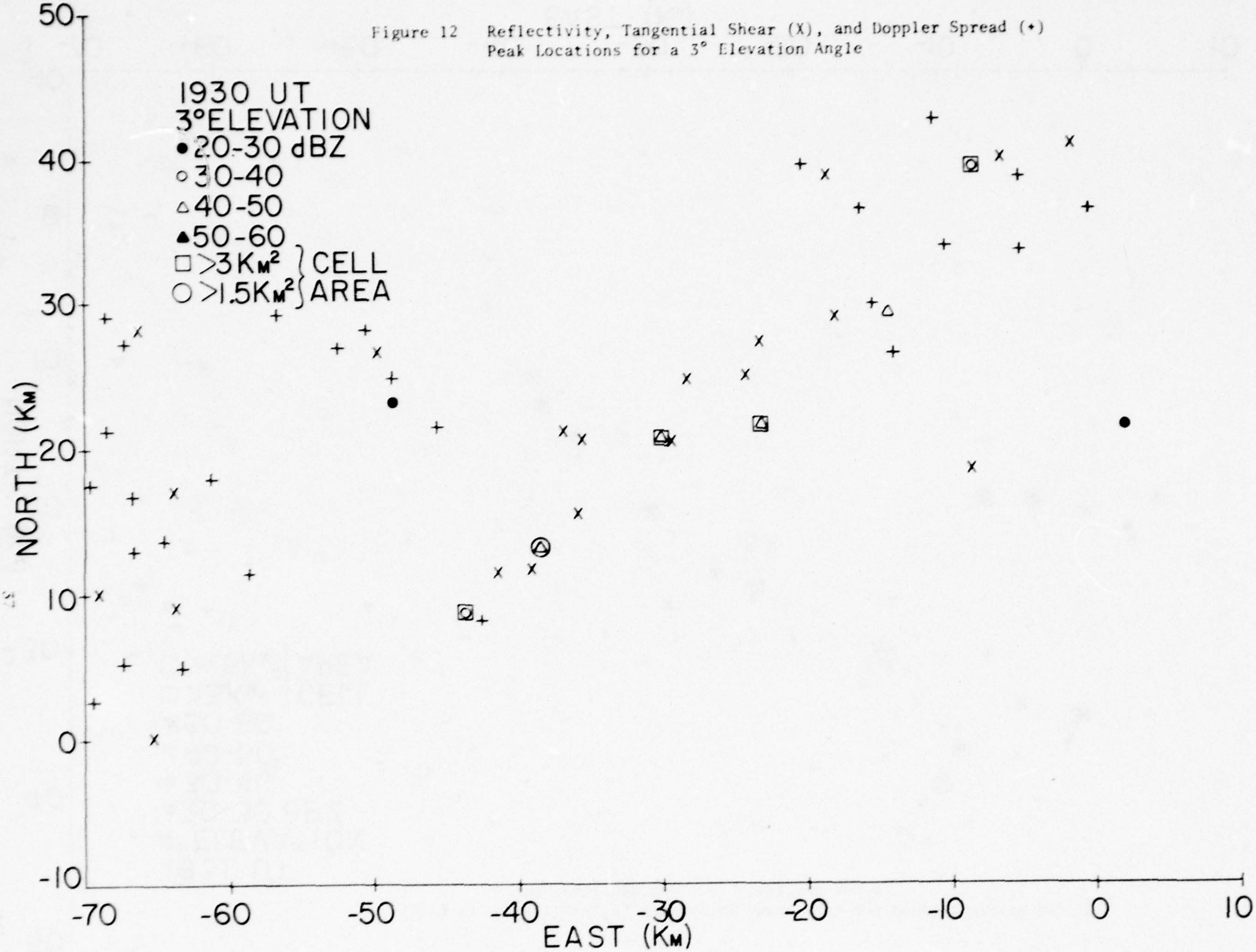


Figure 12 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 3° Elevation Angle

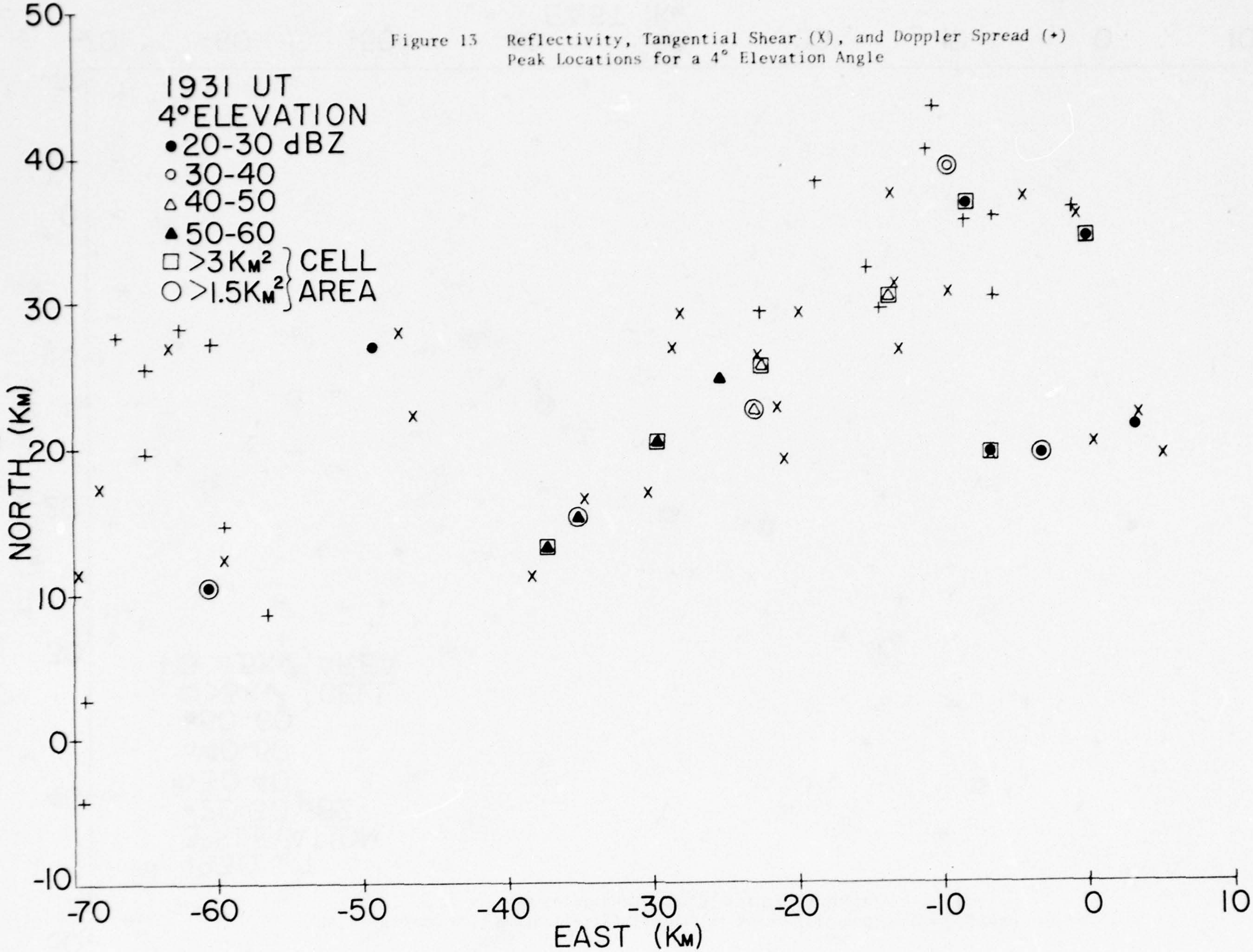
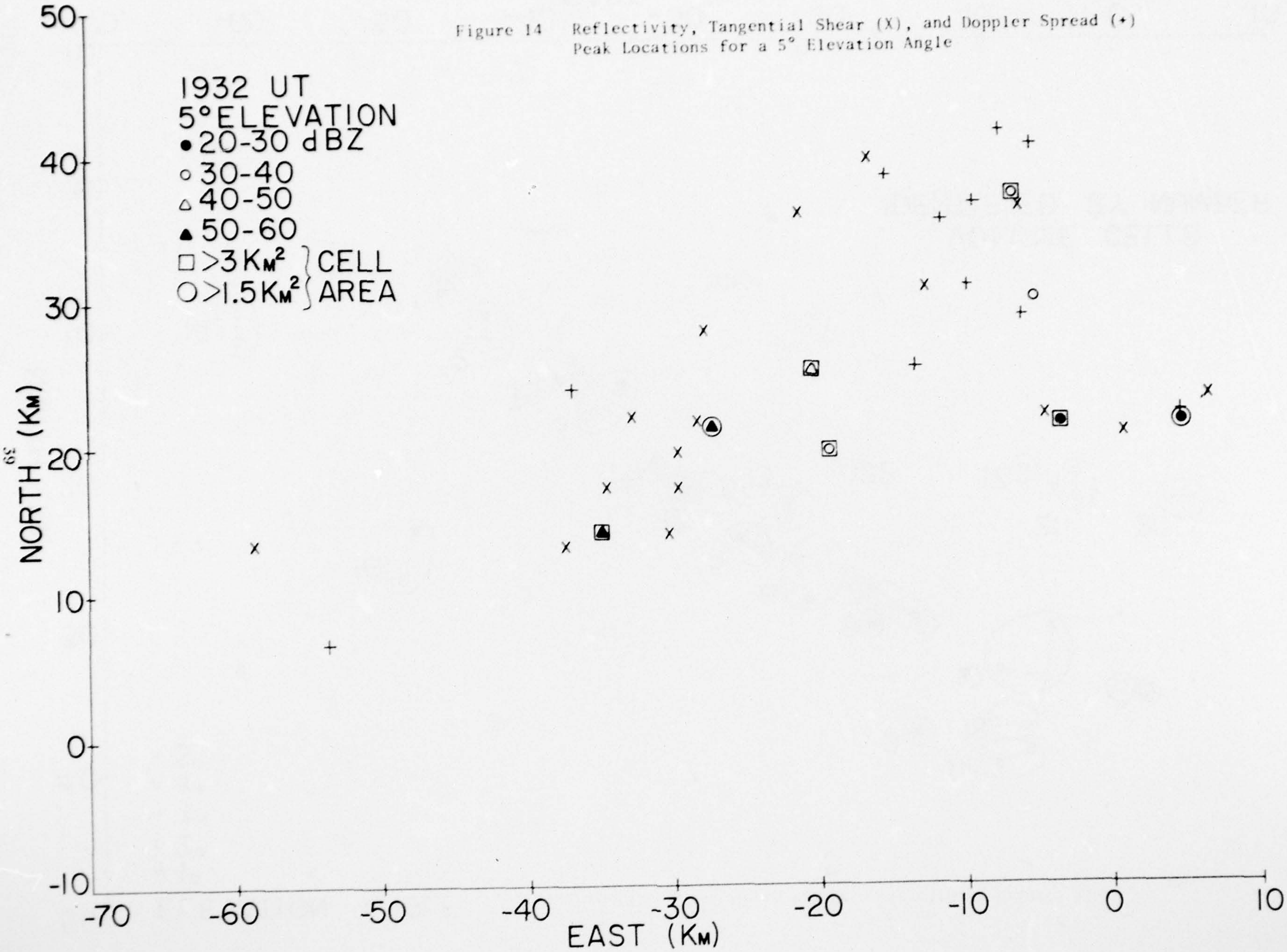


Figure 13 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 4° Elevation Angle

Figure 14 Reflectivity, Tangential Shear (X), and Doppler Spread (+) Peak Locations for a 5° Elevation Angle



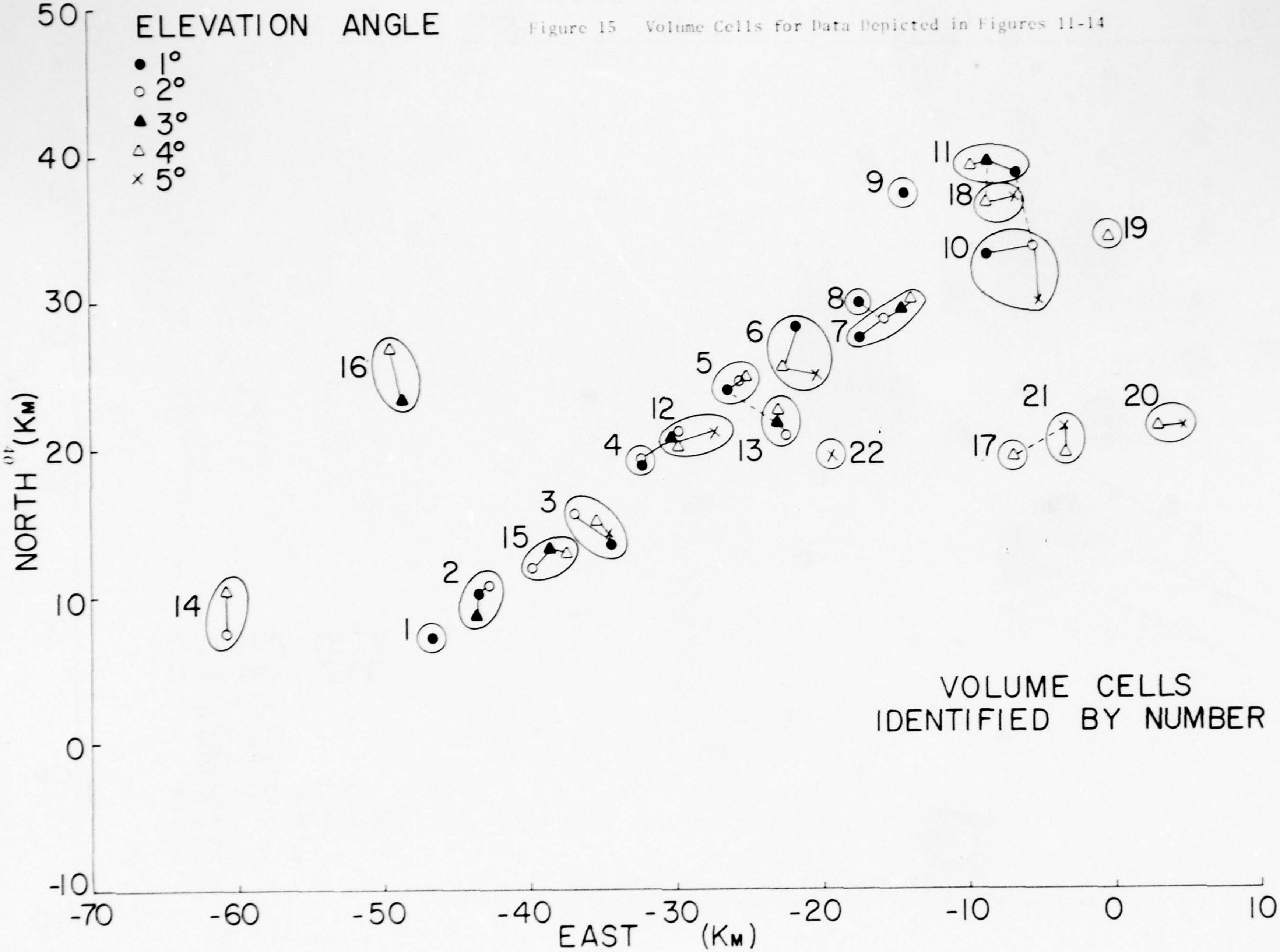


Figure 15 Volume Cells for Data Depicted in Figures 11-14

TABLE 2

VOLUME CELL ATTRIBUTES

ID*	X	Y	H_p	Z_p	H_b	H_T	ΔH	Δp	Volume
1	-46.8	7.3	0.9	39.9	0.9	0.9	0.5	4.0	2.0
2	-43.8	10.3	1.7	49.0	1.1	1.8	0.7	1.5	1.1
3	-34.4	13.7	3.4	54.9	2.9	-	-	3.5	-
4	-32.3	19.1	1.4	53.2	0.9	1.4	0.5	1.5	0.8
5	-26.4	24.1	2.5	52.9	1.0	2.4	1.4	5.4	7.6
6	-21.8	28.5	2.5	49.5	1.9	-	-	3.5	-
7	-17.4	27.8	2.4	47.8	0.7	2.4	1.7	3.2	5.4
8	-17.2	30.1	0.7	40.9	0.7	0.7	0.5	3.9	2.0
9	-14.2	37.5	0.8	33.0	0.8	0.8	0.5	4.4	2.2
10	- 8.9	33.1	2.7	30.7	1.8	-	-	1.4	-
11	- 6.8	38.8	2.2	31.9	0.8	2.9	2.1	2.0	4.2
12	-29.8	21.3	2.4	55.3	1.4	-	-	3.5	-
13	-22.4	21.1	2.3	44.6	1.1	2.3	1.2	1.4	1.7
14	-60.9	7.6	2.4	29.1	2.4	3.6	1.2	1.9	2.3
15	-39.9	12.0	2.2	53.6	1.7	2.8	1.1	1.2	1.4
16	-48.7	23.4	3.0	25.7	3.0	4.0	1.0	12.9	12.9
17	- 6.9	19.8	1.5	21.9	1.5	1.5	0.5	3.4	1.7
18	- 8.5	36.5	3.4	31.0	2.7	-	-	1.9	-
19	- 0.0	34.2	2.5	23.8	2.5	2.5	0.5	1.0	0.5
20	3.4	21.7	2.0	22.4	1.6	-	-	9.0	-
21	- 3.1	19.9	1.9	22.5	1.4	-	-	12.4	-
22	-19.3	-19.8	2.5	39.1	2.5	-	-	1.0	-

*See Figure 15

6. RECOMMENDATIONS

6.1 Parameter Optimization

A set of computer programs has been generated to provide an automatic means for the extraction of information from large volumes of radar data. The programs are written to be as general as possible to enable rapid changes in processing parameters. As indicated in Section 5, the optimum values for these parameters are not known and must be determined. It is expected that the parameters should change from one radar system to the next depending principally on the resolution volume and number of independent samples per resolution element. The first problem to be considered in the use of this set of programs is the optimization of parameters. This can only be done by processing a relatively large number of radar scans for different rain conditions.

Ideally, auxiliary data should be available to provide a standard of comparison for the output from the program. Many case studies such as the one reported in Section 5.1 should be performed to obtain the raw contour data to provide a comparison standard. For use in detecting severe weather events, auxiliary data on the severe events are also required.

6.2 Real Time Processing

The programs, although general in nature, were written with the ultimate goal of use in a real time processor. After the analysis for parameter optimization has been completed, specialization to a real time processor may be accomplished. Real-time processing requires the minimization of computer storage and operating time. Major steps can be made in this direction by increasing the resolution element area for processing (averaging over $\sim$1 km in range as recommended in Section 5.1) and by reducing the number of peak detection operations. The latter can be accomplished by processing either tangential shear or Doppler spread data but not both as is currently done. Another time saving step is to reduce the volume of output by not preparing the fixed level contour plotting displays in the computer but doing the fixed contouring in the color display processor as is currently done for the output of digital integrators.

Preprocessing of the data for calibration, velocity ambiguity resolution, and conversion from variance to velocity spread will also save some time.

Current running time for reflectivity processing only but including fixed contour generation for display is 2 minutes per azimuth scan. By just doing the preprocessing, the running time could be reduced by more than a factor of two. The other reductions recommended above plus internal programming changes to reduce the use of indirect array addressing should result in a program that will do at least two data fields, reflectivity and tangential shear or Doppler spread, in real time (30 seconds per scan).

6.3 Spatial Analysis of Cell Development

The initial considerations of the forecast of new cell site locations indicates that improvements should be possible if attention is focused on the structure or organization of the cell location patterns. Processing to date has used the determination of nearest neighbor distances to obtain information about cell spacings. The nearest neighbor distances provide estimates of the locations of secondary maxima in the spatial correlation function for cell locations. Information on structure can better be obtained from more refined correlation function (or spatial power spectra) of cell location. These analyses should be conducted using a much larger data sample preferably for a number of different locations and storm types.

6.4 Morphological and Climatological Analysis

The programs described above are used to extract the significant information from a large volume of radar data. The result is still a formidable data set comprised of a number of lists of volume cell attributes for each scan, storm, and day. These data must in turn be reduced to a manageable set to describe the morphology of cell development. This analysis must be performed before any meaningful cell forecast procedures can be developed and tested. The analysis entails both the construction of new programs and the processing of large volumes of data.

REFERENCES

Crane, R.K. (1976): "Radar Detection of Thunderstorm Hazards for Air Traffic Control Vol. I Storm Detection", Project Report ATC-67, Vol. I, MIT Lincoln Laboratory, Lexington, Massachusetts.

Crane, R.K. (1977): "Parameterization of Weather Radar Data for Use in the Prediction of Storm Motion and Development", Final Report, Contract No. F19628-76-C-0264, Environmental Research & Technology, Inc.; AFGL-TR-77-0216, Air Force Geophysics Laboratory, Hanscom Air Force Base, Massachusetts.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the help of Messers J. Willand, R. Collins, and P. Piechota in the programming task that comprised the bulk of the work performed under this contract. Mr. P. Feteris performed the nearest neighbor distance analysis using printouts and computer plots made available by MIT Lincoln Laboratory (Crane, 1976). The author also wishes to acknowledge the discussions about the desirability and utility of the processing concepts with Dr. K. Hardy and with the AFGL technical program monitors Messers K. Glover and A. Chmela.

APPENDIX A

CELL DETECTION AND TRACKING PROGRAM INSTRUCTIONS FOR OPERATION

A.1 Description of Input and Output

Program input and output are depicted in Figure A1. The tape input format is given in Table A1. The control cards are discussed in section A2. The program produces (a) tapes of computed attributes for input to a second program for computing volume scans; (b) a plot tape is generated that can be stored for input to another program "EXPAND" which is a general purpose plotting package for plotting the fixed contours, centroids, cell identification and peak locations expanded over selected areas; (c) B-scan maps are also produced as an option; and (d) at the completion of a scan the program will print out fixed contour attributes, peak detected cell attributes and tangential shear maxima attributes. All of the attributes printed have identifiers which can be associated with the identifiers displayed on the expanded plots.

A.2 Control Card Format

Control card input to the program is NAMELIST input which allows certain parameters in the program to default or to be set to different values. The variable names, type (LOGICAL L, INTEGER I, and REAL R), dimension, default value and their meanings are listed in Table A2.

710053

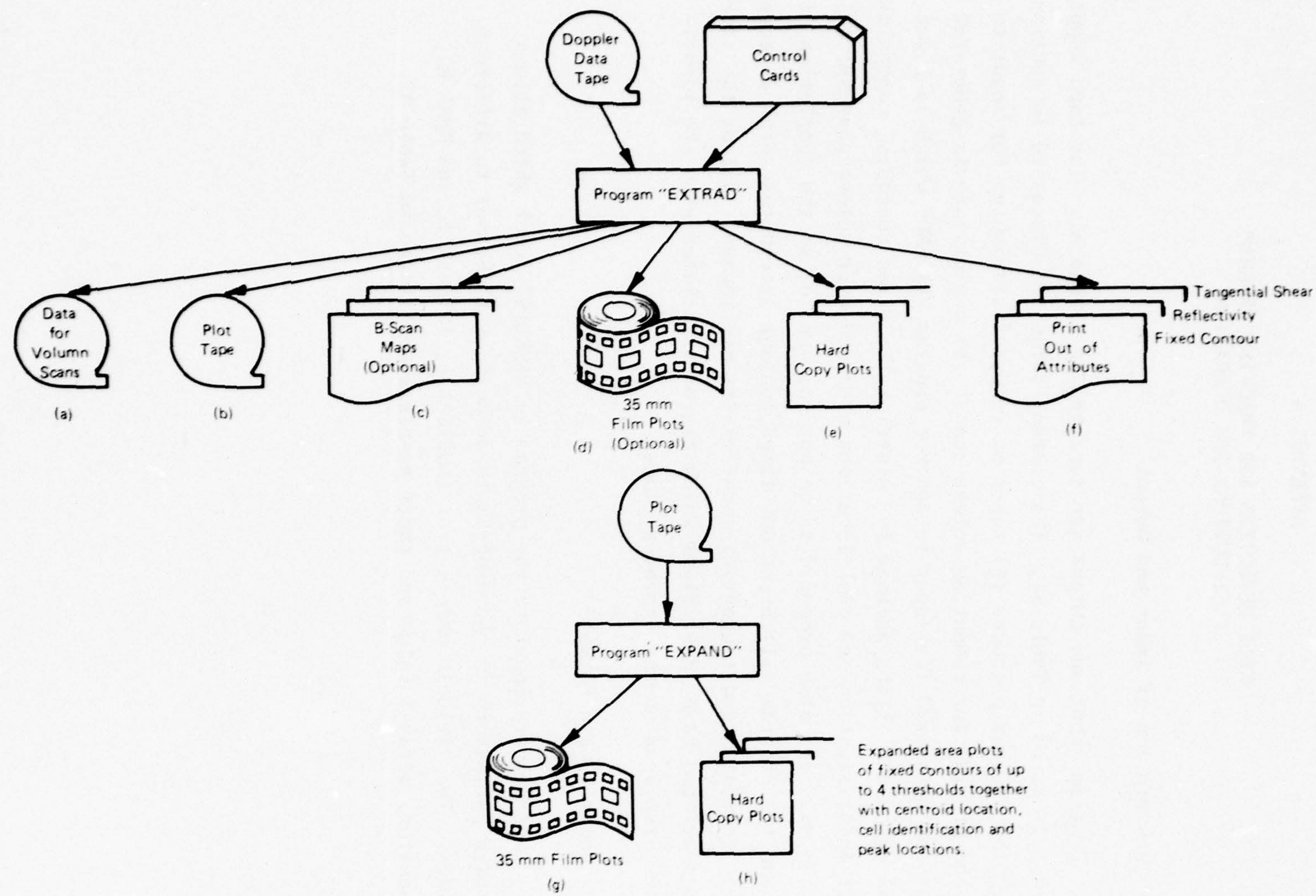


Figure A1 EXTRAD Products

		2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	12 Bit Word Position
ANCILLARY DATA	Day	800	400	200	100	80	40	20	10	8	4	2	1	1
	Hour				20	10	8	4	2	1				2
	Min			40	20	10	8	4	2	1				3
	Sec						40	20	10	8	4	2	1	4
	Status		$T_p 1$	$T_p 0$	SF_1	SF_0		DD	1) NRC_1	1) NRC_0				5
		B					A							
	*PRF	PRF_{11}	PRF_{10}	PRF_9	PRF_8	PRF_7	PRF_6	PRF_5	PRF_4	PRF_3	PRF_2	PRF_1	PRF_0	6
	Azimuth	AZ_{11}	AZ_{10}	AZ_9	AZ_8	AZ_7	AZ_6	AZ_5	AZ_4	AZ_3	AZ_2	AZ_1	2) AZ_0	7
	Spare													8
	Spare													9
	Elevation	EL_{11}	EL_{10}	EL_9	EL_8	EL_7	EL_6	EL_5	EL_4	EL_3	EL_2	EL_1	2) EL_0	10
	Spare													11
	Spare													12
VIDEO DATA Repeated 256 times**	Mean	6) M_{11}	5) M_{10}	M_9	M_8	M_7	M_6	M_5	M_4	M_3	M_2	4) M_1	2) M_2	13 + (I-1)·3
	Variance	6) V_8	V_7	V_6	V_5	V_4	V_3	V_2	V_1	2) V_0				14 + (I-1)·3
	Power	6) P_8	P_7	P_6	P_5	P_4	P_3	P_2	P_1	2) P_0				15 + (I-1)·3

1)

Number Range Cells	NRC_1	NRC_0
256	0	0
512	0	1
768	1	0
1024	1	1

Frequency of Dump Pulses DD	
ALT	0
ALL	1

Subframe SF_1	Subframe SF_0
0	0
0	1
1	0
1	1

Cell Width	T_{p1}	T_{p0}
0.5 μs	0	0
1 μs	0	1
2 μs	1	0

2) Least Significant Bit
3) ---------
4) Not Included in Parity
5) Sign
6) Parity

1 physical record = 158 sixty bit words

* If any group A bit = 1 and any group B bit = 1: PRF = 394
If A has 1 bit and B has 3 bits: PRF = 794
If A has 3 or more and B has 1 or less: PRF = 1613
If A has 3 or more and B has 3 or more: PRF = 3333
If A has 2 bits or B has 2 bits: PRF = Previous PRF
If all zero for A and B groups: use an input PRF

** First cell is the 21st twelve bit data word.

TABLE A1

TABLE A2

CARD FORMAT FOR PROGRAM EXTRAD

Reads in program parameters via NAMELIST format.

NAMELIST VARIABLES: (Level 780415)

NAME	TYPE	DIMENSION	DEFAULT	MEANING
PRINT1	L	1	FALSE	Unused.
PRINT2	L	1	FALSE	If .TRUE. print B-scan maps of mean and variance.
PRINT3	L	1	FALSE	If .TRUE. print B-scan maps of dBz.
PRINT4	L	1	FALSE	Unused.
ICODES	I	36	Blank thru Z then 1 thru 9.	Codes for representing dBz categories for B-scan map output.
A1	R	1	.13779	In the linear equation y = mx+b for computing coded dBz for B-
B1	R	1	1.5	scans, A1 = M and B1 = b.
A2	$	1	.017	Unused.
B2	R	1	18.6	Unused.
CONTRZ	L	1	TRUE	If FALSE, do not process peak cell attributes.
CONTRV	L	1	TRUE	If FALSE, do not process reflectivity, shear, & spread.
CONTRS	L	1	TRUE	If FALSE, do not process shear and spread.
NFILE	I	1	0	Number of files on tape to skip before processing.
NUMF	I	1	1	Number of files on tape to process.
AC	R	4	-107.7, +1.97, -0.94, +.0018	Calibration coefficients for computing DBM below a threshold XCUT. (see XCUT)

NAME	TYPE	DIMENSION	DEFAULT	MEANING
COPLOT	L	1	FALSE	If TRUE, output a tape for plotting.
VOLTAP	L	1	TRUE	If FALSE, do not output an attribute tape.
CALM	R	1	.332	In the calibration equation for
CALB	R	1	-98.3	DBM y = mx+b, CALM = M & CALB = b.
XCUT	R	1	10.0	Threshold value that determines which equation to use for calibration. (linear or non-linear)
CK	R	1	10.0	In the equation for computing dBz, K+P+20ALOG10(S(I-.5)) K = CK.
ZMAX	R	1	0.0	Not currently used.
VMAX	R	1	0.0	Not currently used.
NREC	I	1	1	Not currently used.
NUMR	I	1	999	Number of radials to be processed. Use, default value when doing full scan.
IRUN	I	1	0	Run number chosen by user.
INC	I	1	0	Not currently used.
STARTR	R	1	0.0	Where along a radial in kilometers processing is to start.
STOPR	R	1	300.0	Where along a radial in kilometers processing is to stop.
INPRF	I	1	3333	Value of PRF (Pulse Repetition Frequency) to be used when PRF cannot be obtained from the data tape.
SCALE	R	1	1.0	Scale factor for drawing fixed contours.
AE	R	1	1.21	Constant for computing heights of cells.
AA	R	1	300	Constant for computing rain rate.
BB	R	1	1.5	Exponent for computing rain rate.

NAME	TYPE	DIMENSION	DEFAULT	MEANING
X1	R	1	0.0	Frame size coordinates for fixed contour plotting. Less than or equal to 8 inches.
X2	R	1	8.0	Same as above.
Y1	R	1	0.0	Same as above.
Y2	R	1	8.0	Same as above.
TV	I	1	35	Mean wind velocity in a fixed echo contour is not computed for dBz greater than this value.
TSV	R	1	10^6	Not currently used.
LDV	I	1	3	Cell detection threshold for reflectance peaks.
LTV	I	1	3	Cell detection threshold for velocity peaks.
LSV	I	1	3	Cell detection threshold for shear peaks.
ICOMP	I	1	6	Data compression factor. (range integration)
VMIN	R	1	0.0	Unused.
SVMIN	R	1	0.0	Unused.
AREAMN	R	1	1.0	Any completed contour having an area less than AREAMN will be ignored but is plotted if a fixed contour.
WAVEL	R	1	0.0542	Radar wavelength in meters.
VQUANT	R	1	10.0	Tangential shear quantization step $(m/s/km)^{-1}$.
SQUANT	R	1	2.0	Doppler spread quantization step $(m/s)^{-1}$.
RQUANT	R	1	1.0	Reflectivity quantization steps (in dB^{-1}).
DAZM	R	1	1.0	Beam width (degrees).

NAME	TYPE	DIMENSION	DEFAULT	MEANING
ESTART	R	1	(1.5°)	Elevation start angle (degrees).
DELT	R	1	(.5°)	Delta elevation angle (degrees) defining next scan.

APPENDIX B

PLOTTING PROGRAM 'EXPAND' (VERSION 1.0)

B.1 Description of Input and Output

Program EXPAND utilizes the plot tape generated by program 'EXTRAD' as input to generate not only full scan plots of fixed contours and their centroids but on option will expand and plot certain areas of interest. Also on option, it will plot out locations of centroids of fixed contours, peak detected cells, Doppler spread and tangential shear locals. These plotting options apply to full scan plots as well as expanded plots.

The plots are generated on the CALCOMP ink pen drum plotter. The X axis are labeled negative kilometers west of the radar and positive east. Y axis are labeled negative kilometers south of the radar and positive north. The date and elevation angle are also annotated.

B.2 Control Card Format

Control card input to the program is NAMELIST input which allows certain parameters to default or to be set to different values. The variable names, type, dimension, default and meaning are listed in Table B1.

It is suggested that program EXPAND generate full scan plots of fixed contours from the entire EXTRAD tape first before generating expanded areas of view. This allows one to examine exactly what each scan contains and where expansion would be of interest. One set of NAMELIST input cards are needed for each scan. If, for example, it is desired to go into the third scan on tape, three NAMELIST set ups must occur.

TABLE B1

CARD FORMAT FOR PROGRAM EXPAND
READS IN PROGRAM PARAMETERS VIA NAMELIST INPUT

NAMELIST VARIABLES:

NAME	TYPE	DIMENSION	DEFAULT	MEANING
IPLT	L	4		
IPLT(1)	L		.FALSE.	If .TRUE. plot a dot to locate peak detected cells.
IPLT(2)	L		.FALSE.	If .TRUE. plot a C to locate fix contour centroids.
IPLT(3)	L		.FALSE.	If .TRUE. plot a + to locate Doppler spread.
IPLT(4)	L		.FALSE.	If .TRUE. plot an X to locate tangential shear.
Z1	L	1	.TRUE.	Plot fix contours for first level contour.
Z2	L	1	.TRUE.	Plot fix contours for second level contour.
Z3	L	1	.TRUE.	Always set to .FALSE.
Z4	L	1	.TRUE.	Always set to .FALSE.
LS	L	1	.FALSE.	When .TRUE. expanded area plots are requested. When .FALSE. draw full scan only.
XK1	R	1	-320.0	Western plot area limit (km).
XK2	R	1	320.0	Eastern plot area limit (km).
YK1	R	1	-320.0	Southern plot area limit (km).
YK2	R	1	320.0	Northern plot area limit (km).
LK	L	1	.FALSE.	If .TRUE. plot centroids of given areas.

*Note: Expanded plots will always square off any rectangular area request to the largest axis requested.

APPENDIX C

TRACKING PROGRAM (ASOCCL)

C.1 Description of Input and Output

The input tape is the tape produced by program "EXTRAD". This program takes the cell attributes and associate cells for tracking volume cells. The output listing includes the location of volume cells and the updated cell ID.

C.2 Control Card Format

Control card input to the program is NAMELIST input which allows certain parameters in the program to default or to be set to different values. The variable names, type (LOGICAL L, INTEGER I, and REAL R), dimensions, default values and their meanings are listed in Table C1.

TABLE C1

CARD FORMAT FOR PROGRAM ASOCCL

Reads in Program Parameters via NAMELIST Format

NAMELIST VARIABLES:

NAME	TYPE	DIMENSION	DEFAULT	MEANING
PR1	L	1	FALSE	When .TRUE. program prints out the input attributes data.
PR2	L	1	FALSE	When .TRUE. program prints out the initial volume cell attributes and the total number of cells.
PR3	L	1	FALSE	When .TRUE. program prints out the associated update cell attributes and the total number of associated cells.
PR4	L	1	FALSE	Currently unused.
IDEV1	I	1	1	Input tape or file.
IDEV2	I	1	1	Currently unused.
ISTOP	I	1	1	Stop program, when "0" continue processing.

APPENDIX D

COMPUTER PROGRAM LISTINGS AND SAMPLE OUTPUT

```
PROGRAM EXTRAD      74/74    OPT=2                              FTN 4.6+420          05/06/78  21.36.09        PAGE    1

  1            PROGRAM EXTRAD(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1=0,      EXTRAD     2
              *               TAPE2,TAPE9,DEBUG=OUTPUT,TAPE3,TAPE4)               EXTRAD     3
          C    PROGRAM EXTRAD    ERT NO. 162                                      EXTRAD     4
          C    VERSION 2.0    LEVEL 761119                                        EXTRAD     5
  5       C    MAIN PROGRAM SECTION.                                              EXTRAD     6
          C    JHW       AFGL       CDC 6600                                      EXTRAD     7
          C    **************************************************************     EXTRAD     8
               LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP    TEST       1
               INTEGER CHRD(3)                                                    EXTRAD    10
 10            COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,  TEST       2
              *              CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP     TEST       3
               DATA CHRD/4HPARA,4HEXEC,4HCOMM/                                    EXTRAD    13
          C    --------------------------------------------------------------     EXTRAD    14
               CALL DAY                                                           EXTRAD    15
 15       1    READ (5,11) KEY                                                    EXTRAD    16
          11   FORMAT (A4)                                                        EXTRAD    17
               IF (EOF(5)) 91,21,91                                               EXTRAD    18
          21   CALL PAGE                                                          EXTRAD    19
               WRITE (6,31) KEY                                                   EXTRAD    20
 20       31   FORMAT (1H ,A4)                                                    EXTRAD    21
               DO 41 K=1,3                                                        EXTRAD    22
               IF (KEY.EQ.CHRD(K)) GO TO (61,71,81), K                            EXTRAD    23
          41   CONTINUE                                                           EXTRAD    24
               WRITE (6,51)                                                       EXTRAD    25
 25       51   FORMAT (16H ILLEGAL KEYWORD)                                       EXTRAD    26
               GO TO 91                                                           EXTRAD    27
          C                                                                       EXTRAD    28
          C               * PARAMETERS * PACKAGE.                                 EXTRAD    29
          C                                                                       EXTRAD    30
 30       61   CALL INPARM                                                        EXTRAD    31
               GO TO 1                                                            EXTRAD    32
          C                                                                       EXTRAD    33
          C               * EXECUTION * PACKAGE.                                  EXTRAD    34
          C                                                                       EXTRAD    35
 35       71   CALL EXTRAT                                                        EXTRAD    36
               GO TO 1                                                            EXTRAD    37
          C                                                                       EXTRAD    38
          C               * COMMENTS CARD * PACKAGE.                              EXTRAD    39
          C                                                                       EXTRAD    40
 40       81   CALL INE (5)                                                       EXTRAD    41
               GO TO 1                                                            EXTRAD    42
          C                                                                       EXTRAD    43
          C               END OF JOB.                                             EXTRAD    44
          C                                                                       EXTRAD    45
 45       91   WRITE (6,101)                                                      EXTRAD    46
          101  FORMAT (//2X,7H ENDJOB)                                            EXTRAD    47
          111  STOP                                                               EXTRAD    50
               END                                                                EXTRAD    51

CARD NR. SEVERITY  DETAILS    DIAGNOSIS OF PROBLEM

   22       I                 AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
```

```
      BLOCK DATA                                                          EXTRAD     52
C     ******************************************************************  EXTRAD     53
C     FOR PROGRAM EXTRAD   ERT NO. 162                                    EXTRAD     54
C     VERSION 2.0   LEVEL 761113                                          EXTRAD     55
C     JHW  CDC6600  AFGL                                                  EXTRAD     56
C     ******************************************************************  EXTRAD     57
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP     TEST        4
      INTEGER TL       ,TV,TSV                                            EXTRAD     59
C     ------------------------------------------------------------------  EXTRAD     60
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,   TEST        5
     1CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP                    TEST        6
      COMMON/INSUB/ TL(2),LT,TD4,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)     TEST1       1
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                       TEST2       1
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                         EXTRAD     65
      COMMON /A1024/ MVP(3,1024)                                          EXTRAD     66
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC               EXTRAD     67
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NFP,NSF,NDD,NRC                 EXTRAD     68
      COMMON /HEAD/ TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG         EXTRAD     69
      COMMON /LINUM/ LINE                                                 EXTRAD     70
C     ******************************************************************  EXTRAD     71
      COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                              EX2         1
      COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                                EXTRAD     73
      COMMON /EXPAN/ X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                      EXTRAD     74
      COMMON /ERROR/ IERR                                                 EXTRAD     75
      COMMON/FILTER/TATRMN,AREAMN,DAZM                                    TEST1       2
      COMMON /VELPRM/ WAVEL                                               EXTRAD     76
      COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                                TEST        8
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB,    TEST        9
     +               JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,         TEST       10
     +               IR,JR,KR,IMXJMX                                      TEST       11
      COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),        TEST       12
     +               IBVNT(2),ATR(5,120,2),IAT,NIDF,KDD(2),IDSLOT(120,2)  TEST       13
      COMMON /PRSTORE/ UP(200,3),NUP,IATR(70,29),NUMAX,IACT(70),          TEST       14
     +                 IDC(22),IPTB(22),TB(30,22),IPBNT(30,22),           TEST       15
     +                 IPRNG(50),IPB1(2640),IPB2(2640),IPB3(2640)         TEST       16
      COMMON /PVSTORE/ UV(200,7),NUV,VATR(70,23),NVMAX,IACV(70),          TEST       17
     +                 IDVC(22),IPTVB(22),TVB(30,22),IPBVNT(30,22),       TEST       18
     +                 IPVRNG(50),IPV1(2640),IPV2(2640),IPV3(2640)        TEST       19
      COMMON /PSSTORE/ US(200,5),NUS,SATR(70,17),NSMAX,IACS(70),          TEST       20
     +                 IDSC(22),IPTSB(22),TSB(30,22),IPBSNT(30,22),       TEST       21
     +                 IPSRNG(50),IPS1(2640),IPS2(2640),IPS3(2640)        TEST       22
      COMMON /REFL/W(173),WI(173),WJ(173),HR(173),NCL,NID,NIDF,INCL       TEST2       2
     X,IMX,IMN                                                            TEST2       3
C     ------------------------------------------------------------------  EXTRAD     78
      DATA PRINT1/.FALSE./,PRINT2/.FALSE./,PRINT3/.FALSE./,COPLOT/.TRUE.  EL          1
     +/,A1/.443/,B1/.56/,A2/.96/,B2/18.6/,CONTRZ/.TRUE./,CONTRV/          EL          2
     +.TRUE./,NFILE/0/,NUMF/30/,NREC/1/,NUMR/99999/,CONTRS/.TRUE./        EL          3
     +,VOLTAP/.TRUE./                                                     TEST       27
      DATA TL/20,40/                                                      TEST       28
      DATA X1/0.0/,X2/8.0/,Y1/0.0/,Y2/8.0/,AE/1.21/,AA/400./,BB/1.4/      EL          4
      DATA SL/0.0/,CL/0.0/,TV/35/,TSV/1000000/                            EXTRAD     84
      DATA LT/2/,STARTR/20./,STOPR/150./,ICOMP/6/                         EL          5
      DATA VMIN/0.0/,SVMIN/0.0/,AREAMN/1.0/,DAZM/1.0/                     TEST1       4
      DATA TDW/0.0/,DN/0.0/,RV/256.0,512.0,768.0,1024.0/                  EXTRAD     87
      DATA CELWTH/0.5,1.042,2.0/                                          EXTRAD     88
      DATA ICODES /1H ,1HA,1HB,1HC,1HD,1HE,1HF,1HG,1HH,1HI,1HJ,1HK,1HL,   TEST       30
     +             1HM,1HN,1HO,1HP,1HQ,1HR,1HS,1HT,1HU,1HV,1HW,1HX,1HY,   TEST       31
```

```
             *         1HZ,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/                     TEST      32
             DATA ZMAX/0.0/,VMAX/0.0/,AC/-107.76555,1.9767838,-.094297528,.0001 EXTRAD    92
            182263167,CALH/0.332/,CALB/-36.3/,XCUT/10.0/                        EXTRAD    93
             DATA TITLE/7HPROGRAM,7H EXTRAD,1H ,1H ,1H ,1H /                    EXTRAD    94
             DATA IRUN/0/,NPAGE/0/,ICODE/162/,VERS/2.0/,LEVEL/780501/           EL         6
             DATA INPRF/794/                                                    EL         7
             DATA CK/10.0/,INC/0/                                               EL         8
             DATA SCALE/1.0/,LDV/3/,LTV/3/,LSV/3/                               TEST      33
             DATA IERR/0/                                                       EXTRAD    99
             DATA WAVEL/0.0542/                                                 TEST      34
             DATA VQUANT/10.0/,SQUANT/6.0/,RQUANT/1.0/                          EL         9
             DATA NIDF/120/,IAT/5/,NPA/4/,IEMAX/22/,NFC/2/                      TEST      36
             DATA KMAX/30/,JMXDB/50/,JMAX/60/,IAMAX/2640/,IR/47,JR/30/,KR/22/,  TEST      37
             *     IMXJMX/24/,NCL/173/                                          TEST1      5
             DATA NID/200/,NUP/9/,NIJP/70/,NUMAX/29/                            TEST      39
             DATA NVMAX/23/,NUV/7/,NSMAX/17/,NUS/5/                             TEST      40
             DATA ESTART/1.5/,DELT/.5/                                          EL        10
       C     -------------------------------------------------------------     EXTRAD   102
             END                                                                EXTRAD   103
```

```
      SUBROUTINE INPARM                                                   EXTRAD  104
C$    DEBUG                                                               TEST     41
C$    ARRAYS                                                              TEST     42
C     **************************************************************** EXTRAD  105
C     VERSION 2.0   LEVEL 761119                                          EXTRAD  106
C     JHW    AFGL   CDC6600                                               EXTRAD  107
C     CONTROL CARD INPUT PARAMETERS.                                      EXTRAD  108
C     **************************************************************** EXTRAD  109
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP     TEST     43
      INTEGER TL        ,TV,TSV                                           EXTRAD  111
C     ---------------------------------------------------------------- EXTRAD  112
      DIMENSION PROGID(3)                                                 EXTRAD  113
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,   TEST     44
     +CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP                    TEST     45
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC               EXTRAD  116
      COMMON /HEAD/ TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG         EXTRAD  117
      COMMON/INSUB/ TL(2),LT,TDW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)     TEST1     6
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                       TEST2     4
      COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                              EX2       3
      COMMON /EXPAN/ X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                      EXTRAD  121
      COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                                EXTRAD  122
      COMMON /LOOKUP/ DBZARY(51),ZARY(61)                                 TEST     47
      COMMON/FILTER/TATRMN,AREAMN,DAZM                                    TEST1     7
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                 EXTRAD  125
      COMMON /VELPRM/ WAVEL                                               EXTRAD  126
      COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                                TEST     48
      COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),        TEST     49
     +              IBVNT(2),ATR(5,120,2),IAT,NIDF,KDD(2),IDSLOT(120,2)   TEST     50
C     ---------------------------------------------------------------- EXTRAD  128
      DATA AREAMN/0.0/                                                    EXTRAD  129
      DATA PROGID/7HWILLAND,1H ,1H /                                      EXTRAD  130
      NAMELIST /INPUT/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES,A1,B1,A2,B2,    TEST     51
     +                 CONTRZ,CONTRV,CONTRS,NFILE,NUMF,AC,CALM,CALB,      TEST     52
     +                 XCUT,CK,ZMAX,VMAX,NREC,NUMR,IRUN,INC,TL,LT,TDW,    TEST     53
     +               DN,STARTR,STOPR,INPRF,SCALE,AE,AA,BB,X1,X2,Y1,Y2,    TEST2     5
     +                 TV,TSV,LDV,LTV,LSV,ICOMP,VMIN,SVMIN,AREAMN,WAVEL,  TEST     55
     +             VQUANT,SQUANT,RQUANT,VOLTAP,DAZM,ESTART,DELT           TEST2     6
C     ---------------------------------------------------------------- EXTRAD  135
      READ (5,INPUT)                                                      EXTRAD  136
      IF (EOF(5)) 111,1,111                                               EXTRAD  137
    1 IF(LDV.LT.2)LDV=2                                                   EXTRAD  138
      IF(LTV.LT.2)LTV=2                                                   EXTRAD  139
      IF(LSV.LT.2)LSV=2                                                   EX2       5
      IF(LSV.GT.3)LSV=3                                                   EX2       6
      IF(LTV.GT.3)LTV=3                                                   EX2       7
      IF(LDV.GT.3)LDV=3                                                   EX2       8
      IF(LT.GT.0.AND.LT.LE.NFC)NFC=LT                                     TEST1    10
      IF(ICOMP.LT.6)ICOMP=6                                               TEST     57
      WRITE(6,INPUT)                                                      EXTRAD  140
      DAZM=DAZM*0.017453                                                  TEST1    11
      AR=ALOG10(AA)/BB                                                    EXTRAD  141
      BR=0.1/BB                                                           EXTRAD  142
      SCON=149.89625*ICOMP                                                EXTRAD  143
      BR=BR*RQUANT                                                        TEST     58
      DO 110 I=1,NFC                                                      TEST     59
  110 TL(I)=IFIX(FLOAT(TL(I))*RQUANT)                                     TEST     60
      DO 10 IY=1,61                                                       TEST     61
```

```
            JX=TL(1)+IX-1                                                  EXTRAD   145
      C                                                                    EXTRAD   146
      C   PRESET RAIN RATE - 1 DBZ STEPS                                   EXTRAD   147
      C                                                                    EXTRAD   148
            DBZARY(IX)=10.**(BR*FLOAT(JX)-AR)                              EXTRAD   149
      C                                                                    EXTRAD   150
      C BUILD LINEAR Z TABLE                                               EXTRAD   151
      C                                                                    EXTRAD   152
            ZARY(IX)=10.**(FLOAT(JX)*RQUANT/10.)                           TEST      62
   10       CONTINUE                                                       EXTRAD   154
            IF(.NOT.COPLOT)GO TO 21                                        TEST      63
   11       SCALE=8.0/(Y2-Y1)                                              EXTRAD   168
            IF ((X2-X1).GT.(Y2-Y1)) SCALE=8.0/(X2-X1)                      EXTRAD   169
            XMIN=SCALE*X1                                                  EXTRAD   170
            XMAX=SCALE*X2                                                  EXTRAD   171
            YMIN=SCALE*Y1                                                  EXTRAD   172
            YMAX=SCALE*Y2                                                  EXTRAD   173
   21       IF (.NOT.PRINT2) GO TO 51                                      EXTRAD   174
      C                                                                    EXTRAD   175
      C             PRINT ICODES VALUES.                                   EXTRAD   176
      C                                                                    EXTRAD   177
            CALL PAGE                                                      EXTRAD   178
            WRITE (6,31)                                                   EXTRAD   179
   31       FORMAT (1H0,8X,13HCODE FOR MEAN,7X,5HVALUE,5X,12HCODE FOR VAR,7X,5 EXTRAD   180
           1HVALUE/40X,7HAND PWR)                                          EXTRAD   181
            DO 41 I=1,36                                                   EXTRAD   182
            XA=(FLOAT(I)-B1)/A1                                            EXTRAD   183
            IF (XA.LT.0.) XA=0.                                            EXTRAD   184
            XB=(FLOAT(I)-B2)/A2                                            EXTRAD   185
   41       WRITE (6,51) ICODES(I),XB,ICODES(I),XA                         EXTRAD   186
   51       FORMAT (15X,A1,9X,F9.3,11X,A1,9X,F9.3)                         EXTRAD   187
   61       CONTINUE                                                       EXTRAD   188
            IF (.NOT.PRINT3) GO TO 101                                     EXTRAD   189
            CALL PAGE                                                      EXTRAD   190
            WRITE (6,71)                                                   EXTRAD   191
   71       FORMAT (1H0,8X,13HCODE FOR  DBZ,7X,5HVALUE)                    EXTRAD   192
            DO 81 I=1,36                                                   EXTRAD   193
            XA=(FLOAT(I)-B1)/A1                                            EXTRAD   194
            IF (XA.LT.0.) XA=0.                                            EXTRAD   195
   81       WRITE (6,91) ICODES(I),XA                                      EXTRAD   196
   91       FORMAT (15X,A1,9X,F9.3)                                        EXTRAD   197
  101       CONTINUE                                                       EXTRAD   198
            RETURN                                                         EXTRAD   199
  111       WRITE (6,121)                                                  EXTRAD   200
  121       FORMAT (30H END OF FILE IN NAMELIST INPUT)                     EXTRAD   201
            STOP                                                           EXTRAD   202
            END                                                            EXTRAD   203
```

```
      SUBROUTINE EXTRAT                                                 EXTRAD    204
C     ***************************************************************** EXTRAD    205
C     PJP   MODIFIED 4/27/77         MOD. 1.0                           EXTRAD    206
C     VERSION 1.0   LEVEL=760316                                        EXTRAD    207
C     JHW   AFGL   CDC 6600                                             EXTRAD    208
C     UNPACKING ROUTINE.                                                EXTRAD    209
C     ***************************************************************** EXTRAD    210
C$    DEBUG                                                             TEST       64
C$    ARRAYS                                                            TEST       65
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP   TEST       66
      INTEGER W,V,VS,SV,VB,VSI                                          TEST       67
      INTEGER TL                                                        EXTRAD    221
C     ----------------------------------------------------------------- EXTRAD    225
      DIMENSION IN(158)                                                 EXTRAD    226
      DIMENSION DAYMSK(3),IDAYSFT(3),HRMSK(2),IHRSFT(2),MINMSK(2),      EXTRAD    227
     CIMINSFT(2),SECMSK(2),ISECSFT(2),MVPMSK(5),IMVPSFT(5)              EXTRAD    228
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NCL,NID,NIDP,INCL      TEST2       7
     X,IMX,IMN                                                          TEST2       8
      COMMON /VEL/V(173),VB(173),VS(173),SV(173),VSI(173),              TEST       69
     +               SVI(173),H/(173),HS(173)                           TEST       70
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                       EXTRAD    230
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2, TEST       71
     +          CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP        TEST       72
      COMMON /A1024/ MVP(3,1024)                                        EXTRAD    233
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC             EXTRAD    234
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NOD,NRC               EXTRAD    235
      COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                            EX2        18
      COMMON/INSUB/ TL(2),LT,TD4,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)   TEST1      12
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                     TEST2       9
      COMMON /AZ2/SINA,COSA,DELTAZ,ISCANF,NEL                           EXTRAD    239
      COMMON /ERROR/ IERR                                               EXTRAD    243
C     ----------------------------------------------------------------- EXTRAD    245
      DATA MVPMSK/77770000000000000000B,                                EXTRAD    246
     C00007777000000000000B,                                            EXTRAD    247
     C00000000777700000000B,                                            EXTRAD    248
     C00000000000077770000B,                                            EXTRAD    249
     C00000000000000007777B/                                            EXTRAD    250
      DATA DAYMSK/00170000000000000000B,                                EXTRAD    251
     C03600000000000000000B,                                            EXTRAD    252
     C74000000000000000000B/                                            EXTRAD    253
      DATA HRMSK/00000017000000000000B,                                 EXTRAD    254
     C00000600000000000000B/                                            EXTRAD    255
      DATA   MINMSK/00000000017000000000B,                              EXTRAD    256
     C00000000160000000000B/                                            EXTRAD    257
      DATA SECMSK/00000000000000170000B,                                EXTRAD    258
     C00000000000001600000B/                                            EXTRAD    259
C     DATA IREGMSK/00007777000000000000B/                               EXTRAD    260
      DATA NSMSK/00000000000000000600B/                                 EXTRAD    261
      DATA VPMSK/00000000000000000377B/                                 EXTRAD    262
      DATA MEANM2/00000000000000001777B/                                EXTRAD    263
      DATA ISGNMSK/00000000000000020000B/                               EXTRAD    264
      DATA ELMSK/00000000000000007777B/                                 EXTRAD    265
      DATA MEANM1/00000000777700000000B/                                EXTRAD    266
      DATA VARMSK1/00000000000077770000B/                               EXTRAD    267
      DATA PWRMSK1/00000000000000007777B/                               EXTRAD    268
      DATA AZMSK/00007777000000000000B/                                 EXTRAD    269
      DATA NPSK/74000000000000000000B/                                  EXTRAD    270
```

```
      DATA NRCMSK/00000000000000000030B/                        EXTRAD   271
C     DATA NSFMSK/00000000000000000600B/                        EXTRAD   272
      DATA NDDMSK/00000000000000000040B/                        EXTRAD   273
      DATA NTPMSK/00000000000000003000B/                        EXTRAD   274
      DATA KMSK/00360000000000000000B/                          EXTRAD   275
C     DATA IPARMSK/00000000000000004000B/                       EXTRAD   276
      DATA IMVPSFT/12,24,-24,-12,0/                             EXTRAD   277
      DATA IDAYSFT/12,8,4/                                      EXTRAD   278
      DATA IHRSFT/21,17/                                        EXTRAD   279
      DATA IMINSFT/-27,29/                                      EXTRAD   280
      DATA ISECSFT/-12,-16/                                     EXTRAD   281
      DATA DAZT/2.0/                                            TEST      74
      DATA RPD/0.017453/                                        TEST1     13
      DATA IEND/-999/                                           TEST2     10
C     --------------------------------------------------------- EXTRAD   293
      ENTODG=360./4096.                                         TEST2     11
      NEL=1                                                     TEST2     12
      IFILE=0                                                   EXTRAD   294
2     BUFFER IN (1,1)(IN(1),IN(158))                            EXTRAD   295
      IF(UNIT(1))1,231,1                                        EXTRAD   296
231   WRITE(6,191)                                              EXTRAD   297
      IFILE=IFILE+1                                             EXTRAD   298
1     IF(IFILE .LT. NFILE) GO TO 2                              EXTRAD   299
5     IEOF=0                                                    EXTRAD   300
      ISCANF=0                                                  EXTRAD   301
      IREG=SHIFT(IN(2).AND.ELMSK,0)                             TEST2     13
      NA=1                                                      EXTRAD   303
      NEL=NEL+1                                                 TEST2     14
      ELEV=IREG*ENTODG                                          TEST2     15
      IF(ELEV.GT.180.) ELEV=ELEV-360.                           TEST2     16
      IF(ELEV.LE.ESTART) NEL=1                                  TEST2     17
      IAZENO=1                                                  EXTRAD   305
      IERR=0                                                    EXTRAD   306
12    DO 11 I=1,173                                             TEST      75
      W(I)=0                                                    EXTRAD   308
      V(I)=-999                                                 EXTRAD   309
      VS(I)=-999                                                EXTRAD   310
11    SV(I)=-999                                                EXTRAD   311
C                                                               EXTRAD   312
C             UNPACK DAY HOUR MINUTE SECOND AND STATUS FLAGS.   EXTRAD   313
C                                                               EXTRAD   314
21    IDAY=0                                                    EXTRAD   315
      DO 23 I=1,3                                               EXTRAD   316
      IDAY=IDAY+10**(I-1)*SHIFT(IN(1) .AND. DAYMSK(I),IDAYSFT(I)) EXTRAD 317
23    CONTINUE                                                  EXTRAD   318
      IHOUR=0                                                   EXTRAD   319
      DO 25 I=1,2                                               EXTRAD   320
      IHOUR=IHOUR+10**(I-1)*SHIFT(IN(1) .AND. HRMSK(I),IHRSFT(I)) EXTRAD 321
25    CONTINUE                                                  EXTRAD   322
      IMIN=0                                                    EXTRAD   323
      DO 27 I=1,2                                               EXTRAD   324
      IMIN=IMIN+10**(I-1)*SHIFT(IN(1) .AND. MINMSK(I),IMINSFT(I)) EXTRAD 325
27    CONTINUE                                                  EXTRAD   326
      IHHMM=IHOUR*100+IMIN                                      TEST2     18
      ISEC=0                                                    EXTRAD   327
      DO 29 I=1,2                                               EXTRAD   328
      ISEC=ISEC+10**(I-1)*SHIFT(IN(1) .AND. SECMSK(I),ISECSFT(I)) EXTRAD 329
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```
   29 CONTINUE                                                  EXTRAD   330
      NTP=SHIFT(IN(1) .AND. NTPMSK,-9)                          EXTRAD   331
      NSF=SHIFT(IN(1) .AND. NSMSK,-7)                           EXTRAD   332
      NOD=SHIFT(IN(1) .AND. NODMSK,-5)                          EXTRAD   333
      NRC=SHIFT(IN(1) .AND. NRCMSK,-3)                          EXTRAD   334
C                                                               EXTRAD   335
C            UNPACK PRF AZIMUTH, AND ELEVATION.                 EXTRAD   336
C                                                               EXTRAD   337
      K=SHIFT(IN(2) .AND. NMSK,4)                               EXTRAD   338
      N=SHIFT(IN(2) .AND. KMSK,11)                              EXTRAD   339
      PRF=INPRF                                                 EXTRAD   340
      IF (K.EQ.0.AND.N.EQ.0) GO TO 51                           EXTRAD   341
      JA=0                                                      EXTRAD   342
      JB=0                                                      EXTRAD   343
      DO 31 I=1,4                                               EXTRAD   344
      IREG=2**(I-1)                                             EXTRAD   345
      IF ((IREG.AND.N).NE.0) JA=JA+1                            EXTRAD   346
      IF ((IREG.AND.K).NE.0) JB=JB+1                            EXTRAD   347
   31 CONTINUE                                                  EXTRAD   348
      IF (JA.EQ.1.AND.JB.EQ.1) PRF=394.                         EXTRAD   349
      IF (JA.EQ.1.AND.JB.EQ.3) PRF=794.                         EXTRAD   350
      IF (JA.GE.3.AND.JB.LE.1) PRF=1613.                        EXTRAD   351
      IF (JA.GE.3.AND.JB.GE.3) PRF=3333.                        EXTRAD   352
      GO TO 51                                                  EXTRAD   353
   51 CONTINUE                                                  EXTRAD   354
      IREG=SHIFT(IN(2) .AND. AZMSK,24)                          EXTRAD   355
      AZMUTH(NA)=IREG*ENTODG                                    TEST2     19
      IREG=SHIFT(IN(2) .AND. ELMSK,0)                           EXTRAD   357
      ELEVAT=IREG*ENTODG                                        TEST2     20
      IF (ELEVAT.GT.180.) ELEVAT=ELEVAT-360.                    EXTRAD   359
C                                                               EXTRAD   360
C            UNPACK THE DATA.                                   EXTRAD   361
C            NSF IS SUBFRAME.                                   EXTRAD   362
C                                                               EXTRAD   363
      K=NSF*256+1                                               EXTRAD   364
      KEEP=K                                                    EXTRAD   365
C                                                               EXTRAD   366
C            UNPACK FIRST DATA WORD.                            EXTRAD   367
C                                                               EXTRAD   368
      MVP(1,K)=SHIFT(IN(3) .AND. MEANM1,-24)                    EXTRAD   369
      MVP(2,K)=SHIFT(IN(3) .AND. VARMSK1,-12)                   EXTRAD   370
      MVP(3,K)=SHIFT(IN(3) .AND. PWRMSK1,0)                     EXTRAD   371
      N=3                                                       EXTRAD   372
C                                                               EXTRAD   373
C            UNPACK REMAINING DATA.                             EXTRAD   374
C                                                               EXTRAD   375
   61 DO 65 I=1,3                                               EXTRAD   376
      N=N+1                                                     EXTRAD   377
      DO 63 J=1,5                                               EXTRAD   378
      IF(I .EQ. 1 .AND. (J .EQ. 1 .OR. J .EQ. 4))K=K+1          EXTRAD   379
      IF(I .EQ. 1 .AND. (J .EQ. 1 .OR. J .EQ. 4))M=1            EXTRAD   380
      IF(I .EQ. 2 .AND. (J .EQ. 2 .OR. J .EQ. 5))K=K+1          EXTRAD   381
      IF(I .EQ. 2 .AND. (J .EQ. 2 .OR. J .EQ. 5))M=1            EXTRAD   382
      IF(I .EQ. 3 .AND. (J .EQ. 3))K=K+1                        EXTRAD   383
      IF(I .EQ. 3 .AND. (J .EQ. 3))M=1                          EXTRAD   384
      MVP(M,K)=SHIFT(IN(N) .AND. MVPMSK(J),IMVPSFT(J))          EXTRAD   385
      M=M+1                                                     EXTRAD   386
```

```
 63    CONTINUE                                                                  EXTRAD   367
 65    CONTINUE                                                                  EXTRAD   368
       IF(N .LT. 155) GO TO 61                                                   EXTRAD   389
 C                                                                               EXTRAD   390
 C              CLEAN OFF EXTRA BITS.                                            EXTRAD   391
 C                                                                               EXTRAD   392
       DO 71 I=KEEP,K                                                            EXTRAD   393
 C     IPAR1=SHIFT(MVP(1,I) .AND. IPARMSK,-11)                                   EXTRAD   394
       IREG=SHIFT(MVP(1,I) .AND. ISGNMSK,-10)                                    EXTRAD   395
       MVP(1,I)=MVP(1,I) .AND. MEANM2                                            EXTRAD   396
       IF (IREG.GT.0) MVP(1,I)=-MVP(1,I)                                         EXTRAD   397
 C     IPAR2=SHIFT(MVP(2,I) .AND. IPARMSK,-11)                                   EXTRAD   398
       MVP(2,I)=SHIFT(MVP(2,I) .AND. VPMSK,-3)                                   EXTRAD   399
 C     IPAR3=SHIFT(MVP(3,I) .AND. IPARMSK,-11)                                   EXTRAD   400
       MVP(3,I)=SHIFT(MVP(3,I) .AND. VPMSK,-3)                                   EXTRAD   401
 71    CONTINUE                                                                  EXTRAD   402
 C                                                                               EXTRAD   405
 C              GET NEXT TAPE RECORD.                                            EXTRAD   406
 C                                                                               EXTRAD   407
 81    BUFFER IN (1,1) (IN(1),IN(158))                                           EXTRAD   408
       IF (UNIT(1)) 91,111,201                                                   EXTRAD   409
 201   WRITE(6,211)                                                              EXTRAD   410
 91    NC=SHIFT(IN(1).AND.NRCMSK,-3)                                             EXTRAD   411
       NP=SHIFT(IN(1).AND.NTPMSK,-9)                                             EXTRAD   412
       IF(NC.NE.NRC.OR.NP.NE.NTP)GOTO 121                                        EXTRAD   413
       NS=SHIFT(IN(1).AND.NSMSK,-7)                                              EXTRAD   414
       IREG=SHIFT(IN(2) .AND. AZMSK,24)                                          EXTRAD   415
       AZ=IREG*ENTODG                                                            TEST2     21
       IF((NS .GT. NSF .AND. NRC .GE. NST.OR. AZ .EQ. AZMUTH(NA)) GOTO 21 EXTRAD          417
       IREG=SHIFT(IN(2).AND.ELMSK,0)                                             TEST2     22
       EL=IREG*ENTODG                                                            TEST2     23
       IF(EL.GT.180.) EL=EL-360.                                                 TEST2     24
 C  FINISHED RADIAL,TEST FOR END OF SCAN                                         EXTRAD   418
       DAZ=AZ-AZMUTH(NA)                                                         EXTRAD   419
       DELTAZ=DAZ                                                                EXTRAD   420
       IF (ABS(DAZ).GT.DAZT) GO TO 101                                           EXTRAD   421
       DAZS=SIGN(1.,DAZ)                                                         EXTRAD   422
       IF(NA.EQ.1)DAZF=DAZS                                                      EXTRAD   423
       IF (DAZF.EQ.DAZS) GO TO 141                                               EXTRAD   424
 101   AZ=AZ+360.*DAZF                                                           EXTRAD   425
       DAZ=AZ-AZMUTH(NA)                                                         EXTRAD   426
       DELTAZ=DAZ                                                                EXTRAD   427
       IF (ABS(DAZ).GT.DAZT) GO TO 121                                           EXTRAD   428
       DAZS=SIGN(1.,DAZ)                                                         EXTRAD   429
       IF (DAZF.NE.DAZS) GO TO 121                                               EXTRAD   430
 141   DAZE=AZ-AZMUTH(1)                                                         EXTRAD   431
       IF(ABS(DAZE).GT.DAZT)IAZEND=0                                             EXTRAD   432
       DAZES=SIGN(1.,DAZE)                                                       EXTRAD   433
       IF(ABS(DAZE).LT.DAZT.AND.IAZEND.EQ.0.AND.DAZES.EQ.DAZF)GO TO 122          EXTRAD   434
       DELTAZ=ABS(DELTAZ*RPD)                                                    TEST2     25
       IF(ABS(EL-ELEVAT).GT.DELT)GO TO 121                                       TEST2     26
       ELEV=ELEV+ELEVAT                                                          TEST1     16
       CALL COMPZ                                                                EXTRAD   435
       CALL CONTOR                                                               TEST      76
 161   NA=NA+1                                                                   EXTRAD   441
       IF(NA .GT. NUMR)GOTO 121                                                  EXTRAD   442
       GOTO 12                                                                   EXTRAD   443
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      C     FINISHED SCAN                                        EXTRAD   444
        122 ISCANF=+1                                            TEST2     27
            GO TO 131                                            EXTRAD   446
        111 IEOF=1                                               EXTRAD   447
        121 ISCANF=-1                                            EXTRAD   448
        131 IF(NA.LE.10)GO TO 132                                EXTRAD   449
            ISCANT=ISCANF                                        TEST1     18
            ISCANF=0                                             TEST1     19
            ELEV=ELEV+ELEVAT                                     TEST1     20
            DELTAZ=ABS((AZMUTH(NA)-AZMUTH(NA-1)))*RPD            TEST2     28
            CALL COMPZ                                           TEST1     22
            CALL CONTOR                                          TEST1     23
            ISCANF=ISCANT                                        TEST1     24
            ELEVAT=ELEV/NA                                       TEST1     25
            CALL CONTRZ                                          TEST      77
        132 REWIND 4                                             EXTRAD   455
            REWIND 9                                             EXTRAD   456
            IF(COPLOT) WRITE(2)IDAY,IHHMM,IEND                   TEST2     29
            IF (IEOF.EQ.1) GO TO 181                             EXTRAD   457
            IF (NA.GE.NUMR) RETURN                               EXTRAD   458
            GOTO 5                                               EXTRAD   459
        181 WRITE (6,191)                                        EXTRAD   460
            IFILE=IFILE+1                                        EXTRAD   461
            IF(IFILE .LT. NUMF+NFILE) GO TO2                     EXTRAD   462
        191 FORMAT (19H EOF READ ON UNIT 1)                      EXTRAD   463
        211 FORMAT (21H PARITY ERR ON UNIT 1)                    EXTRAD   464
        221 RETURN                                               EXTRAD   465
            END                                                  EXTRAD   466
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      SUBROUTINE COMPZ                                                  EXTRAD   467
C$    DEBUG                                                             TEST      78
C$    ARRAYS                                                            TEST      79
C     ***************************************************************** EXTRAD   468
C     VERSION 2.0   LEVEL 761113                                        EXTRAD   469
C     JHW   AFGL   CDC6600                                              EXTRAD   470
C     COMPUTES DBZ.                                                     EXTRAD   471
C     ***************************************************************** EXTRAD   472
      INTEGER WM                                                        TEST1     26
      INTEGER W,V,VS,SV,V3,VSI                                          TEST      80
      INTEGER TL,VL,VAV,VAVA,VMX,VMO,VELFIN,VARMIN,SVTAB(512)           TEST      81
C     ----------------------------------------------------------------- EXTRAD   475
      COMMON /A1024/ MVP(3,1024)                                        EXTRAD   476
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                       EXTRAD   479
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC             EXTRAD   480
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NOD,NRC               EXTRAD   481
      COMMON/INSUB/ TL(2),LT,TOW,ON,STARTR,STOPR,RN(4),SCON,CELWTH(3)   TEST1     27
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                     TEST2     30
      COMMON /AZ2/ SINA,COSA,DELTAZ,ISCANF,NEF                          EXTRAD   484
      COMMON /VELPRM/ WAVEL                                             EXTRAD   485
      COMMON /FILTER/TATRMN,AREAMN,DAZM                                 TEST1     28
      COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                              TEST      83
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NCL,NID,NIDP,INCL      TEST2     31
     X,IMX,IMN                                                          TEST2     32
      COMMON /VEL/V(173),V3(173),VS(173),SV(173),VSI(173),              TEST      85
     +              SVI(173),HV(173),HS(173)                            TEST      86
C     ----------------------------------------------------------------- EXTRAD   489
C                                                                       EXTRAD   490
C             FETCH NUMBER OF RANGE CELLS (N).                          EXTRAD   491
C                                                                       EXTRAD   492
      IFLAG=0                                                           TEST1     29
      IF(NA.NE.1)GO TO 100                                              EXTRAD   494
      NPCL=0                                                            EXTRAD   495
      NTPL=0                                                            EXTRAD   496
      PRFL=0                                                            EXTRAD   497
100   IF(NRCL.EQ.NRC.AND.NTP.EQ.NTPL.AND.PRF.EQ.PRFL)GO TO 5            EXTRAD   498
      VCON=(WAVEL/4.)*PRF/2047.                                         TEST1     30
      PRFL=PRF                                                          EXTRAD   500
      VCON2=(VCON*2047.)*(VCON*2047.)*0.2026/511*SQUANT*SQUANT          TEST1     31
      DO 1001 IX=1,512                                                  TEST      89
 1001 SVTAB(IX)=IFIX(SQRT(VCON2*FLOAT(IX-1)))                           TEST1     32
      VCON=VCON*VQUANT                                                  TEST      91
      VMX=VCON*1024                                                     EXTRAD   502
      VMO=VMX*2                                                         EXTRAD   503
      VELMIN=VMIN/VCON                                                  EXTRAD   504
      VARMIN=SVMIN/VCON2                                                EXTRAD   505
      NN=RN(NRC+1)+1                                                    EXTRAD   506
      ISKP=6                                                            TEST2     33
      MM=STOPR*1000./(SCON*CELWTH(NTF+1))*FLOAT(ICOMP)+1+ISKP           TEST2     34
      MM=MIN0(MM,NN)-1                                                  TEST1     34
      N=(MM-ISKP)/ICOMP                                                 TEST2     35
      INCL=N+2                                                          TEST2     36
      IF(INCL.GT.NCL) INCL=NCL                                          TEST2     37
      IMX=N+1                                                           TEST2     38
C                                                                       EXTRAD   508
C     COMPRESS DATA BY ICOMP                                            EXTRAD   509
C                                                                       EXTRAD   510
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```
          ISTCL=1                                                   EXTRAD  512
          IDD3=ICOMP+ISKP                                           EXTRAD  513
          IF(STARTR .EQ. 0.) GO TO 5                                EXTRAD  514
          ISTCL=(STARTR*1000./(SCON*CELWTH(NTP+1)))+1               TEST1    36
          M=ISTCL                                                   TEST1    37
          IMN=M+1                                                   TEST2    39
          IDD3=ICOMP*ISTCL+ISKP                                     EXTRAD  516
    5     DO 3 K=IDD3,MM,ICOMP                                      EXTRAD  517
          J=(K-ISKP)/ICOMP                                          EXTRAD  518
          DO 3 I=1,3                                                EXTRAD  519
          IREG=0                                                    EXTRAD  520
          IDD1=K-ICOMP+1                                            EXTRAD  521
          DO 1 IX=IDD1,K                                            EXTRAD  522
    1     IREG=IREG+MVP(I,IX)                                       EXTRAD  523
          MVP(I,J)=IREG/ICOMP                                       EXTRAD  524
    3     CONTINUE                                                  EXTRAD  525
    C                                                               EXTRAD  528
    C             COMPUTE DBZ                                       EXTRAD  529
    C                                                               EXTRAD  530
          IF(NTP.EQ.NTPL.AND.NRC.EQ.NRCL)GO TO 11                   EXTRAD  531
    C                                                               EXTRAD  532
    C     BUILD LOOK UP TABLE FOR CALIBRATION ON CELL WIDTH CHANGE  EXTRAD  533
    C                                                               EXTRAD  534
          DO 7 JX=M,N                                               EXTRAD  535
    7     VJ(JX)=CK+20.*ALOG10((SCON*(FLOAT(JX)-.5))*CELWTH(NTP+1))+.5  EXTRAD  536
          NRCL=NRC                                                  EXTRAD  537
          NTPL=NTP                                                  EXTRAD  538
          DELR=SCON*CELWTH(NTP+1)                                   EXTRAD  539
          TATMMK=ARE AMN*1.E06/DELR                                 EXTRAD  540
          NRCP=NRC+1                                                EXTRAD  541
          WRITE(6,200)NRCP,DELR,PRF                                 EXTRAD  542
  200     FORMAT(10X,20HNO OF RECORDS/RADIAL,I3, 6X,10HCELL WIDTH,  EXTRAD  543
         *F7.1,2X,6HMETERS,6X,3HPRF,F8.1)                           EXTRAD  544
   11     VL=-999                                                   EXTRAD  545
          IVA=0                                                     EXTRAD  546
           IVS=0                                                    EXTRAD  547
          VAVA=0                                                    EXTRAD  548
          IF(NA .EQ. 1) VAS=0                                       EXTRAD  549
          VAV=VAS                                                   EXTRAD  550
          WM=0                                                      TEST1    38
          DO 41 J=M,N                                               EXTRAD  551
          JP=J+1                                                    EXTRAD  552
          P=MVP(3,J)                                                EXTRAD  553
          IF (P.LE.XCUT) GO TO 21                                   EXTRAD  554
    C                                                               EXTRAD  555
    C             USE LINEAR CALIBRATION.                           EXTRAD  556
    C                                                               EXTRAD  557
          P=P*CALM+CALB                                             EXTRAD  558
          GO TO 31                                                  EXTRAD  559
    C                                                               EXTRAD  560
    C             USE NON LINEAR CALIBRATION.                       EXTRAD  561
    C                                                               EXTRAD  562
   21     P=AC(1)+AC(2)*P+AC(3)*P**2+AC(4)*P**3                     EXTRAD  563
   31     W(J+1)=IFIX(P+VJ(J))*RQUANT                               TEST     92
          WM=MAX0(WM,W(JP))                                         TEST1    39
          IF(W(J+1) .LT. TL(1))  W(J+1)=0                           EXTRAD  565
    C                                                               EXTRAD  566
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C             COMPUTE V                                          EXTRAD    567
C                                                                EXTRAD    568
          IF(IABS(MVP(1,J)) .LT. VELMIN) W(JP)=0                 EXTRAD    569
          IF(IABS(MVP(2,J)) .LT. VARMIN) W(JP)=0                 EXTRAD    570
          IF(W(JP) .LE. TL(1)) GO TO 37                          EXTRAD    571
          V(J+1)=IFIX(VCON*FLOAT(MVP(1,J)))                      EXTRAD    572
          IF(VL .EQ. -999) VL=VAV                                EXTRAD    573
          IF(V(JP) -VL .GT. VMX) V(JP)= V(JP)-VMD                EXTRAD    574
          IF(VL-V(JP) .GT.VMX) V(JP)=V(JP)+VMD                   EXTRAD    575
          IF(VB(JP) .EQ. -999 .OR. NA .EQ. 1)GO TO 37            EXTRAD    576
          IF (V(JP) -VB(JP) .GT. VMX) V(JP)=V(JP) -VMD           EXTRAD    577
          IF(VB(JP)-V(JP) .GT. VMX) V(JP)=V(JP)+VMD              EXTRAD    578
          VAVA=VAVA + V(JP)                                      EXTRAD    579
          IVS=IVS+1                                              EXTRAD    580
          GO TO 35                                               EXTRAD    581
   37     IF(IVS .LE. 10) GO TO  33                              EXTRAD    582
          VAV=VAVA/IVS                                           EXTRAD    583
          IF( IVA .EQ. 0) VAS =VAV                               EXTRAD    584
          IVA =1                                                 EXTRAD    585
   33     VAVA =0                                                EXTRAD    586
          IVS=0                                                  EXTRAD    587
   35     VL=V(JP)                                               EXTRAD    588
          IF(V(JP) .EQ.-999) GOTO 41                             EXTRAD    589
          IF(MVP(2,J).LT.0.OR.MVP(2,J).GT.511)GO TO 4111         TEST1      40
          SV(JP)=SVTAB(MVP(2,J)+1)                               TEST1      41
 4111     IF(VB(J+1).EQ.-999.OR.NA.EQ.1)GO TO 41                 TEST       95
          R=SCON*(FLOAT(JP)-.5)*CELWTH(NTP+1)                    EXTRAD    592
          VS(JP)=(V(JP)-VB(JP))/R*1000./DELTAZ                   TEST1      42
   41     CONTINUE                                               EXTRAD    594
          DO 45 JP=3,N                                           EXTRAD    595
          IF(V(JP-1) .EQ. -999 .OR. V(JP) .EQ. -999 .OR. V(JP+1) .EQ. -999)  EXTRAD    596
         1 GOTO 45                                               EXTRAD    597
          IVMEAN=(V(JP+1)+V(JP-1))/2                             EXTRAD    598
          IF(V(JP)-IVMEAN .GT. VMX) V(JP)=V(JP)-VMD              EXTRAD    599
          IF(IVMEAN-V(JP) .GT. VMX) V(JP)=V(JP)+VMD              EXTRAD    600
   45     CONTINUE                                               EXTRAD    601
          DO 51 J=1,NCL                                          EXTRAD    602
   51     VB(J)=V(J)                                             EXTRAD    603
          IF(IFLAG.EQ.0.OR.WH.GT.70) RETURN                      TEST1      43
          WRITE(6,300)M,N,(W(J),V(J),VS(J),SV(J),J=M,N)          EXTRAD    605
  300     FORMAT(1X,2I4,/,(1X,20I5/))                            EXTRAD    606
          RETURN                                                 EXTRAD    607
          END                                                    EXTRAD    608
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      SUBROUTINE CONTOR                                                  TEST      96
C     ****************************************************************** EXTRAD   614
C$    DEBUG                                                              EX2       24
C$    ARRAYS                                                             TEST      97
C     VERSION 2.0   LEVEL 761119                                         EXTRAD   615
C     JHW    AFGL    CDC6600                                             EXTRAD   616
C       FIXED CONTOURS, PEAK DETECTION, EVENT ASSOCIATION.               EXTRAD   617
C     ****************************************************************** EXTRAD   618
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP    TEST      98
      INTEGER W,WI,HR,TL,TV,TS                                           TEST2     40
      INTEGER V,VB,VS,SV,VSI,SVI,HV,HS                                   TEST     100
      REAL DI(22),HZ(2,15,22),VI(3,15,22),CI(3,22,2),DSI(120),           TEST     101
     +          ZH(12,15,1),CTR(22,2)                                    TEST2     41
C     ------------------------------------------------------------------ EXTRAD   633
      COMMON/INSUB/ TL(2),LT,TJW,JN,STARTR,STOPR,RN(4),SCON,CELWTH(3)    TEST1     44
     1,ICOMP,VPIN,SVMIN,ESTART,DELT                                      TEST2     42
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,  TEST     104
     +              CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP     TEST     105
      COMMON /A1024/ MVP(3,1024)                                         EXTRAD   639
      COMMON /AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                        EXTRAD   640
      COMMON /VALMAX/ ZMAX,VMAX,AC(4),CALM,CALB,XCUT,CK,INC              EXTRAD   641
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                EXTRAD   642
      COMMON /MORED/ INPRF,SCALE,LDV,LTV,LSV                             EX2       29
      COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                               EXTRAD   644
      COMMON /AZ2/SINA,COSA,DELTAZ,ISCANF,NEL                            EXTRAD   647
      COMMON /LOOKUP/ DBZARY(51),ZARY(61)                                TEST     106
      COMMON/FILTER/TATRMN,AREAMN,DAZM                                   TEST1     45
      COMMON /ERROR/ IERR                                                EXTRAD   650
      COMMON /QUANTX/ VQUANT,SQUANT,RQUANT                               TEST     107
      COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),       TEST     108
     +              IBVNT(2),ATR(5,120,2),IAT,NIDF,KDD(2),IDSLOT(120,2)  TEST     109
      COMMON /VEL/ V(173),VB(173),VS(173),SV(173),VSI(173),SVI(173),     TEST     110
     +          HV(173),HS(173)                                          TEST     111
      COMMON /PRSTORE/ UP(200,3),NUP,TATR(70,29),NUMAX,IACT(70),         TEST     112
     +                IDC(22),IPTB(22),TB(30,22),IPBNT(30,22),           TEST     113
     +                IPRNG(60),IPB1(2640),IPB2(2640),IPB3(2640)         TEST     114
      COMMON /PVSTORE/ UV(200,7),NUV,VATR(70,23),NVMAX,IACV(70),         TEST     115
     +                IDVC(22),IPTVB(22),TVB(30,22),IPBVNT(30,22),       TEST     116
     +                IPVRNG(60),IPV1(2640),IPV2(2640),IPV3(2640)        TEST     117
      COMMON /PSSTORE/ US(200,5),NUS,SATR(70,17),NSMAX,IACS(70),         TEST     118
     +                IDSC(22),IPTSB(22),TSB(30,22),IPBSNT(30,22),       TEST     119
     +                IPSRNG(60),IPS1(2640),IPS2(2640),IPS3(2640)        TEST     120
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NNCL,NID,NIDP,NCL       TEST2     43
     X,IMX,IMN                                                           TEST2     44
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),         TEST1     46
     +              JMXDB,JMAX,IPC1(2640),IPC2(2640),IPC3(2640),         TEST1     47
     +              IAMAX,IR,JR,KR,IMXJMX                                TEST1     48
C     ------------------------------------------------------------------ EXTRAD   652
      DATA RPD/.017453/                                                  EXTRAD   653
      DATA IFUP/3000/,IPDN/2000/                                         EXTRAD   654
      DATA IVUP/4000/,ITUP/5000/,ISUP/6000/,ISSP/7000/                   EX2       33
      DATA NHZ/2/,NVI/3/,NZH/15/,NZP/12/,NPB/3/,NNE/1/                   TEST     122
C     ------------------------------------------------------------------ EXTRAD   656
C             NTP=CELL WIDTH 0,1,2  MEANING .5,1.042,2.                  EXTRAD   657
C             NSF=SUBFRAME 0,1,2,3                                       EXTRAD   658
C             NDD=FREQ. OF DUMP PULSES     ALT=0,ALL=1                   EXTRAD   659
C             NRC=NO. RANGE CELLS    0,1,2,3  MEANING 256,512,768,1024   EXTRAD   660
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      C     -------------------------------------------------------------- EXTRAD  661
            IFLAG=0                                                          TEST1    49
            IF(IFLAG.EQ.1)PRINT 7,(W(IX),IX=1,173)                           TEST    124
            RANG=SCON/ICOMP*(RN(NRC+1)-.5)/4.                                TEST1    50
            SCONC=SCON/RANG                                                  TEST1    51
            RANG=RANG*CELWTH(NTP+1)/1000.                                    TEST1    52
      7     FORMAT(1X,20I5)                                                  EXTRAD  664
            IF (.NOT.PRINT3) GO TO 1                                         EXTRAD  665
            IF (NA.EQ.1) CALL PRANG                                          EXTRAD  666
            CALL PRN2(1)                                                     EXTRAD  668
      1     CONTINUE                                                         EXTRAD  670
            IF(NA.EQ.1)WRITE(2)RN(NRC+1),CELWTH(NTP+1),ELEVAT                TEST    126
            AZNOW=AZMUTH(NA)                                                 TEST1    53
            IF (NA.EQ.1) GO TO 11                                            EXTRAD  671
            TEMP=AZMUTH(NA-1)                                                EXTRAD  672
            TEMP=TEMP*RPD                                                    EXTRAD  675
            GO TO 61                                                         EXTRAD  676
      C                                                                      EXTRAD  677
      C                INITIALIZE.                                           EXTRAD  678
      C                                                                      EXTRAD  679
      11    TEMP=0.0                                                         EXTRAD  680
            SL=SIN(ELEVAT*RPD)/1000.                                         EXTRAD  683
            CL=COS(ELEVAT*RPD)**2/A=/6.731E09                                EXTRAD  684
            NCEL=1                                                           EXTRAD  685
            NVCEL=1                                                          EXTRAD  686
            NSCEL=1                                                          EX2      34
            DO 312 J=1,NID                                                   TEST    127
            DO 313 K=1,NUP                                                   TEST    128
      313   UP(J,K)=0.0                                                      TEST    129
            DO 314 K=1,NUV                                                   TEST    130
      314   UV(J,K)=0.0                                                      TEST    131
            DO 315 K=1,NUS                                                   TEST    132
      315   US(J,K)=0.0                                                      TEST    133
      312   CONTINUE                                                         TEST    134
            DO 31 K=1,NIDF                                                   TEST    135
            DSI(K)=0.                                                        EXTRAD  688
      31    CONTINUE                                                         EXTRAD  689
            DO 3111 J=1,NCL                                                  TEST    136
            WI(J)=W(J)                                                       TEST    137
            VSI(J)=VS(J)                                                     TEST    138
      3111  SVI(J)=SV(J)                                                     TEST    139
            DO 32 J=1,NNE                                                    EXTRAD  690
            DO 32 L=1,NZH                                                    EXTRAD  691
            DO 32 K=1,NZP                                                    EXTRAD  692
      32    ZH(K,L,J)=0.0                                                    EXTRAD  693
            DO 41 K=1,NIDF                                                   TEST    140
            DO 41 J=1,IAT                                                    EXTRAD  695
            DO 41 L=1,NFC                                                    EXTRAD  696
      41    ATR(J,K,L)=0.0                                                   EXTRAD  697
            DO 51 K=1,NFC                                                    EXTRAD  698
            DO 51 L=1,IEMAX                                                  EXTRAD  699
            CTR(L,K)=0.                                                      TEST2    45
            DO 51 J=1,NPA                                                    EXTRAD  700
            IB(J,L,K)=0                                                      EXTRAD  701
      51    IC(J,L,K)=0                                                      EXTRAD  702
            DO 52 J=1,NFC                                                    EXTRAD  703
            IBVNT(J)=0                                                       TEST1    54
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            ICVNT(J)=0                                                  TEST2     46
            KDD(J)=0                                                    EX1       17
            DO 52 K=1,NIDF                                              TEST     141
            IDSLOT(K,J)=0                                               EXTRAD   705
         52 CONTINUE                                                    EXTRAD   706
            KNID=1                                                      EXTRAD   707
      61    CONTINUE                                                    EXTRAD   708
      C                                                                 EXTRAD   709
            DO 71 K=1,IEMAX                                             EXTRAD   710
            DO 71 J=1,NZH                                               EXTRAD   711
            DO 71 L=1,NHZ                                               EXTRAD   712
      71    HZ(L,J,K)=0.0                                               EXTRAD   713
            DO 81 K=1,IEMAX                                             EXTRAD   714
            DO 81 J=1,NVI                                               EXTRAD   715
            DO 81 L=1,NZH                                               EXTRAD   716
      81    VI(J,L,K)=0.0                                               EXTRAD   717
            DO 91 K=1,IEMAX                                             EXTRAD   718
            DO 91 J=1,NFC                                               EXTRAD   719
            DO 91 L=1,NPB                                               EXTRAD   720
      91    CI(L,K,J)=0.0                                               EXTRAD   721
            DO 101 K=1,IEMAX                                            EXTRAD   722
            DI(K)=0.0                                                   EXTRAD   723
            IDC(K)=0                                                    EXTRAD   724
            IDVC(K)=0                                                   EXTRAD   725
            IDSC(K)=0                                                   EX2       35
      101   CONTINUE                                                    TEST     142
            DO 102 J=1,JMAX                                             TEST     143
            IPRNG(J)=0                                                  TEST     144
            IPVRNG(J)=0                                                 TEST     145
            IPSRNG(J)=0                                                 TEST     146
      102   CONTINUE                                                    TEST     147
      111   CONTINUE                                                    EXTRAD   732
            IPS=0                                                       EX2       37
            IPV=0                                                       EXTRAD   733
            IP=0                                                        EXTRAD   734
            IPB=0                                                       EXTRAD   735
            IPVB=0                                                      EXTRAD   736
            IPSB=0                                                      EX2       38
      C                                                                 EXTRAD   737
      C                FIND EVENTS                                      EXTRAD   738
      C                                                                 EXTRAD   739
            DO 281 I=IMN,NCL                                            TEST2     47
            DO 231 K=1,NFC                                              EXTRAD   741
            IF (W(I).GT.TL(K)) GO TO 131                                EXTRAD   742
            GO TO 241                                                   EXTRAD   743
      131   IF (W(I-1).LE.TL(K)) GO TO 141                              EXTRAD   744
            GO TO 151                                                   EXTRAD   745
      141   ICVNT(K)=ICVNT(K)+1                                         EXTRAD   746
            IF(ICVNT(K).LE.IEMAX)GO TO 1411                             EX1       18
            WRITE(6,1412)IEMAX,K                                        EX1       19
      1412  FORMAT(1X,*EVENT COUNTER EXCEEDED MAX VALUE, IMAX=*,I6,5X,  EX1       20
           **K=*,I4)                                                    EX1       21
            ICVNT(K)=IEMAX                                              EX1       22
      1411  IEVENT=ICVNT(K)                                             EX1       23
            IF (K.EQ.1) IE0=IEVENT                                      EXTRAD   748
            IC(1,IEVENT,K)=I-1                                          EXTRAD   749
            IC(3,IEVENT,K)=IE0                                          EXTRAD   750
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      C                                                          EXTRAD   751
      C                TALLY ATTRIBUTES.                         EXTRAD   752
      C                                                          EXTRAD   753
  151 R=SCON*(FLOAT(I-1)-.5)*DELWTH(NTP+1)                       EXTRAD   754
      INDX=W(I)-YL(1)+1                                          EXTRAD   755
      IF(INDX.GT.61)INDX=61                                      TEST     148
      IF(INDX.LE.0) INDX=1                                       TEST2     48
      WR=R*ZARY(INDX)                                            EXTRAD   757
      IEVENT=ICVNT(K)                                            EXTRAD   758
      CI(1,IEVENT,K)=CI(1,IEVENT,K)+R                            EXTRAD   759
      CI(2,IEVENT,K)=CI(2,IEVENT,K)+WR                           EXTRAD   760
      CI(3,IEVENT,K)=CI(3,IEVENT,K)+R*WR                         EXTRAD   761
      IF (K.NE.1) GO TO 231                                      EXTRAD   762
      C                                                          EXTRAD   763
      C                PEAK DETECTION, LOCATE AND COUNT PEAKS.   EXTRAD   764
      C                                                          EXTRAD   765
      IF (W(I)-W(I-1)) 171,181,161                               EXTRAD   766
  161 IPB=I-1                                                    EXTRAD   767
      GO TO 181                                                  EXTRAD   768
  171 IF (IPB.EQ.0) GO TO 181                                    EXTRAD   769
      IP=IP+1                                                    EXTRAD   770
      IF(IP.LE.JMAX)GO TO 1711                                   EX1       24
      WRITE(6,1913)IP,IEVENT                                     EX1       25
      GO TO 181                                                  EX1       26
 1711 IPRNG(IP)=(I+IPB)/2                                        TEST     149
      IPB=0                                                      EXTRAD   772
  181 CONTINUE                                                   EXTRAD   773
      IF (VS(I).EQ.-999) GO TO 191                               EXTRAD   774
      IF (VS(I-1).EQ.-999) GO TO 201                             EXTRAD   775
      IF (IABS(VS(I))-IABS(VS(I-1))) 191,211,201                 EXTRAD   776
  191 IF (IPVB.EQ.0) GO TO 211                                   EXTRAD   777
      IPV=IPV+1                                                  EXTRAD   778
      IF(IPV.LE.JMAX)GO TO 1912                                  EX1       28
      WRITE(6,1913)IPV,IEVENT                                    EX1       29
 1913 FORMAT(1X,*NUMBER OF PEAKS EXCEEDS ARRAY SIZE*,2I6)        EX1       30
      GO TO 211                                                  EX1       31
 1912 IPVRNG(IPV)=(I+IPVB)/2                                     TEST     150
      IPVB=0                                                     EXTRAD   780
      GO TO 211                                                  EXTRAD   781
  201 IPVB=I-1                                                   EXTRAD   782
  211 CONTINUE                                                   EXTRAD   783
      IF(SV(I).EQ.-999)GO TO 1911                                EX2       39
      IF(SV(I-1).EQ.-999)GO  TO 2011                             EX2       40
      IF(IABS(SV(I))-IABS(SV(I-1)))1911,2111,2011                EX2       41
 1911 IF(IPSB.EQ.0)GO TO 2111                                    EX2       42
      IPS=IPS+1                                                  EX2       43
      IF(IPS.LE.JMAX)GO TO 1914                                  EX2       44
      WRITE(6,1913)IPS,IEVENT                                    EX2       45
      GO TO 2111                                                 EX2       46
 1914 IPSRNG(IPS)=(I+IPSB)/2                                     TEST     151
      IPSB=0                                                     EX2       48
      GO TO 2111                                                 EX2       49
 2011 IPSB=I-1                                                   EX2       50
 2111 CONTINUE                                                   EX2       51
      IH=IFIX(R*SL+R*R*CL)+1                                     EXTRAD   784
      IE1=IEVENT                                                 TEST1     55
      IF (IH.LE.0.OR.IH.GT.NZ+1) GO TO 221                       EXTRAD   785
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      HZ(1,IH,IE1)=HZ(1,IH,IE1)+WR                               EXTRAD   787
      HZ(2,IH,IE1)=HZ(2,IH,IE1)+R                                EXTRAD   788
      IF (W(I).GT.TV.OR.SV(I).GT.TSV) GO TO 221                  EXTRAD   789
      IF (W(I).LT.TL(1).OR.V(I).EQ.-999) GO TO 221               EXTRAD   790
      VI(1,IH,IE1)=VI(1,IH,IE1)+V(I)                             EXTRAD   791
      VI(2,IH,IE1)=VI(2,IH,IE1)+V(I)*V(I)                        EXTRAD   792
      VI(3,IH,IE1)=VI(3,IH,IE1)+1.0                              EXTRAD   793
  221 CONTINUE                                                   EXTRAD   794
      IF (REL.NE.1) GO TO 231                                    EXTRAD   795
      RAIN=DBZARY(INDX)                                          EXTRAD   796
      DI(IE1)=DI(IE1)+RAIN*R                                     EXTRAD   797
  231 CONTINUE                                                   EXTRAD   798
      GO TO 281                                                  EXTRAD   799
  241 DO 271 KL=K,NFC                                            EXTRAD   800
      IF (W(I-1).LE.TL(KL)) GO TO 281                            EXTRAD   801
      IEVENT=ICVNT(KL)                                           EXTRAD   802
      IC(2,IEVENT,KL)=I-1                                        EXTRAD   803
C                                                                EXTRAD   804
C               KEEP COUNT OF PEAKS WITH EVENT.                  EXTRAD   805
C                                                                EXTRAD   806
      IF (KL.NE.1) GO TO 271                                     EXTRAD   807
      IF (IPB.EQ.0) GO TO 251                                    EXTRAD   808
      IP=IP+1                                                    EXTRAD   809
      IPRNG(IP)=(I+IPB)/2                                        TEST     152
      IPB=0                                                      EXTRAD   811
  251 IDC(IEVENT)=IP                                             EXTRAD   812
      IF (IPVB.EQ.0) GO TO 261                                   EXTRAD   814
      IPV=IPV+1                                                  EXTRAD   815
      IPVRNG(IPV)=(I+IPVB)/2                                     TEST     153
      IPVB=0                                                     EXTRAD   817
  261 IDVC(IEVENT)=IPV                                           EXTRAD   818
      IF(IPSB.EQ.0)GO TO 2611                                    EX2       52
      IPS=IPS+1                                                  EX2       53
      IPSRNG(IPS)=(I+IPSB)/2                                     TEST     154
      IPSB=0                                                     EX2       55
 2611 IDSC(IEVENT)=IPS                                           EX2       56
  271 CONTINUE                                                   EXTRAD   820
  281 CONTINUE                                                   EXTRAD   821
  321 COST=COS(TEMP)                                             EXTRAD   830
      SINT=SIN(TEMP)                                             EXTRAD   831
      COSA=COS(AZNOW*RPD)                                        EXTRAD   832
      COSA2=COSA*COSA                                            EXTRAD   833
      SINA=SIN(AZNOW*RPD)                                        EXTRAD   834
      SINA2=SINA*SINA                                            EXTRAD   835
      SNACNA=SINA*COSA                                           EXTRAD   836
C                                                                EXTRAD   839
C               PLOT FIXED CONTOURS.                             EXTRAD   840
C                                                                EXTRAD   841
      DO 611 K=1,NFC                                             EXTRAD   842
      JEM=IBVNT(K)                                               TEST1     56
      IEM=ICVNT(K)                                               TEST1     57
      IPU=IPUP+K                                                 EXTRAD   843
      IPD=IPDN+K                                                 EXTRAD   844
      KEVENT=1                                                   EXTRAD   845
      IEVENT=1                                                   EXTRAD   846
  331 IF (IB(2,IEVENT,K).EQ.0.AND.IC(2,KEVENT,K).EQ.0) GO TO 601 EXTRAD   847
      IF (IB(1,IEVENT,K).GT.IC(2,KEVENT,K)) GO TO 471            EXTRAD   848
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      IF (IB(2,IEVENT,K).LT.IC(1,KEVENT,K)) GO TO 471                  EXTRAD    849
C                                                                      EXTRAD    850
C                ASSOCIATED                                            EXTRAD    851
C                LEFT SIDE PEN UP.                                     EXTRAD    852
C                                                                      EXTRAD    853
      IID=IB(NPA,IEVENT,K)                                             EXTRAD    854
      IF(IID.NE.0) GO TO 3311                                          TEST2      49
 3312 GO TO 471                                                        TEST2      50
 3311 IC(NPA,KEVENT,K)=IID                                             TEST2      51
      IF(.NOT.COPLOT)GO TO 341                                         TEST      155
      X=FLOAT(IB(1,IEVENT,K))-1.0                                      EXTRAD    856
      R=SCONC*X                                                        TEST      156
      X=SCALE*(R*SINT+4.0)                                             EXTRAD    858
      Y=SCALE*(R*COST+4.0)                                             EXTRAD    859
      WRITE(2)X,Y,IPU                                                  EXTRAD    861
C                                                                      EXTRAD    862
C                LEFT SIDE PEN DOWN.                                   EXTRAD    863
C                                                                      EXTRAD    864
      X=FLOAT(IC(1,KEVENT,K))-1.0                                      EXTRAD    865
      R=SCONC*X                                                        TEST      157
      X=SCALE*(R*SINA+4.0)                                             EXTRAD    867
      Y=SCALE*(R*COSA+4.0)                                             EXTRAD    868
      WRITE(2)X,Y,IPU                                                  EXTRAD    870
  341 IF(ISCANF.NE.0) GO TO 3311                                       TEST2      52
      ATR(1,IID,K)=ATR(1,IID,K)+DELTAZ*CI(1,KEVENT,K)                  TEST2      53
      ATR(2,IID,K)=ATR(2,IID,K)+DELTAZ*CI(2,KEVENT,K)                  EXTRAD    872
      ATR(3,IID,K)=ATR(3,IID,K)+SINA*DELTAZ*CI(3,KEVENT,K)             EXTRAD    873
      ATR(4,IID,K)=ATR(4,IID,K)+COSA*DELTAZ*CI(3,KEVENT,K)             EXTRAD    874
      IE1=IC(3,KEVENT,K)                                               EXTRAD    875
      IID1=IC(NPA,IE1,1)                                               EXTRAD    876
      IF(ATR(IAT,IID,K).EQ.0.)ATR(IAT,IID,K)=IDSLOT(IID1,1)            EXTRAD    881
      IF(IC(1,KEVENT,K).LT.IMN.OR.IC(2,KEVENT,K).GE.IMX)               TEST2      54
     XATR(IAT,IID,K)=-ABS(ATR(IAT,IID,K))                              TEST2      55
      IF(K.NE.1) GO TO 381                                             TEST2      56
      DO 361 IH=1,NZH                                                  EXTRAD    885
      IF (HZ(2,IH,KEVENT).LE.0) GO TO 361                              EXTRAD    886
      IF (VI(3,IH,KEVENT).LE.0) GO TO 351                              EXTRAD    887
      ZH(1,IH,NNE)=ZH(1,IH,NNE)+VI(1,IH,KEVENT)                        EXTRAD    888
      ZH(2,IH,NNE)=ZH(2,IH,NNE)+VI(2,IH,KEVENT)                        EXTRAD    889
      ZH(3,IH,NNE)=ZH(3,IH,NNE)+SINA*VI(1,IH,KEVENT)                   EXTRAD    890
      ZH(4,IH,NNE)=ZH(4,IH,NNE)+COSA*VI(1,IH,KEVENT)                   EXTRAD    891
      ZH(5,IH,NNE)=ZH(5,IH,NNE)+SINA2*VI(3,IH,KEVENT)                  EXTRAD    892
      ZH(6,IH,NNE)=ZH(6,IH,NNE)+COSA2*VI(3,IH,KEVENT)                  EXTRAD    893
      ZH(7,IH,NNE)=ZH(7,IH,NNE)+SNACNA*VI(3,IH,KEVENT)                 EXTRAD    894
      ZH(8,IH,NNE)=ZH(8,IH,NNE)+SINA*VI(3,IH,KEVENT)                   EXTRAD    895
      ZH(9,IH,NNE)=ZH(9,IH,NNE)+COSA*VI(3,IH,KEVENT)                   EXTRAD    896
      ZH(10,IH,NNE)=ZH(10,IH,NNE)+VI(3,IH,KEVENT)                      EXTRAD    897
  351 ZH(11,IH,NNE)=ZH(11,IH,NNE)+HZ(1,IH,KEVENT)*DELTAZ               EXTRAD    898
      ZH(12,IH,NNE)=ZH(12,IH,NNE)+HZ(2,IH,KEVENT)*DELTAZ               EXTRAD    899
  361 CONTINUE                                                         EXTRAD    900
      DSI(IID)=DSI(IID)+DI(KEVENT)*DELTAZ                              EXTRAD    901
  381 IF(IEVENT.GE.JEM) GO TO 441                                      TEST1      58
      IF(IB(1,IEVENT+1,K).GT.IC(2,KEVENT,K)) GO TO 441                 TEST1      59
C                                                                      EXTRAD    905
C                DRAW DOWN TO PRESENT AZMUTH.                          EXTRAD    906
C                                                                      EXTRAD    907
      IF(.NOT.COPLOT)GO TO 6003                                        TEST      158
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      X=FLOAT(IB(2,IEVENT,K))-1.0                                     EXTRAD    908
      R=SCONC*X                                                       TEST      159
      X=SCALE*(R*SINT+4.0)                                            EXTRAD    910
      Y=SCALE*(R*COST+4.0)                                            EXTRAD    911
      WRITE(2)X,Y,IPU                                                 EXTRAD    913
      X=SCALE*(R*SINA+4.0)                                            EXTRAD    914
      Y=SCALE*(R*COSA+4.0)                                            EXTRAD    915
      WRITE(2)X,Y,IPD                                                 EXTRAD    917
      WRITE(2)X,Y,IPU                                                 EXTRAD    918
C                                                                     EXTRAD    919
C               DRAW OVER TO IEVENT+1                                 EXTRAD    920
C                                                                     EXTRAD    921
      X=FLOAT(IB(1,IEVENT+1,K))-1.0                                   EXTRAD    922
      R=SCONC*X                                                       TEST      160
      X=SCALE*(R*SINA+4.0)                                            EXTRAD    924
      Y=SCALE*(R*COSA+4.0)                                            EXTRAD    925
      WRITE(2)X,Y,IPD                                                 EXTRAD    927
      WRITE(2)X,Y,IPU                                                 EXTRAD    928
C                                                                     EXTRAD    929
C               DRAW UP TO PREVIOUS AZMUTH.                           EXTRAD    930
C                                                                     EXTRAD    931
      X=SCALE*(R*SINT+4.0)                                            EXTRAD    932
      Y=SCALE*(R*COST+4.0)                                            EXTRAD    933
      WRITE(2)X,Y,IPD                                                 EXTRAD    935
 6003 IEVENT=IEVENT+1                                                 TEST      161
      KID=IB(NPA,IEVENT,K)                                            EXTRAD    938
 3814 IF(KID.EQ.IID) GO TO 381                                        TESTZ      57
      IF(KID.GT.0) GO TO 401                                          TEST2      58
      GO TO 381                                                       TESTZ      59
  401 IF (ATR(IAT,KID,K).EQ.0.0.OR.ATR(IAT,IID,K).EQ.0.0) GO TO 381   EXTRAD    941
      IATT=IAT-1                                                      EXTRAD    942
      DO 411 J=1,IATT                                                 EXTRAD    943
  411 ATR(J,IID,K)=ATR(J,IID,K)+ATR(J,KID,K)                          EXTRAD    944
      IF (ATR(IAT,KID,K).LT.0.0.OR.ATR(IAT,IID,K).LT.0.0) ATR(IAT,IID,K) EXTRAD 945
     1=-ABS(ATR(IAT,IID,K))                                           EXTRAD    946
      DO 430 JE=1,JEM                                                 TEST1      61
      IF(IB(NPA,JE,K).EQ.KID) IB(NPA,JE,K)=IID                        TEST1      62
  430 CONTINUE                                                        TEST1      63
      DO 431 JE=1,KEVENT                                              TEST1      64
      IF(IC(NPA,JE,K).EQ.KID) IC(NPA,JE,K)=IID                        TEST1      65
  431 CONTINUE                                                        TEST1      66
      RKNIDT=ABS(ATR(IAT,IID,K))                                      TEST1      67
      RKNIDU=ABS(ATR(IAT,KID,K))                                      TEST1      68
      DO 412 J=1,IAT                                                  EXTRAD    950
  412 ATR(J,KID,K)=0.0                                                EXTRAD    951
      IDSLOT(KID,K)=0                                                 EXTRAD    952
      DO 4112 JK=1,IEMI                                               TESTZ      60
      IF(ABS(CTR(JK,K)).EQ.RKNIDU) CTR(JK,K)=ATR(IAT,IID,K)           TEST2      61
 4112 CONTINUE                                                        TESTZ      62
      IF(K.GT.1) GO TO 381                                            TEST1      69
      IF(RKNIDT.EQ.0.0.OR.RKNIDU.EQ.0.0) GO TO 421                    TEST1      70
      NUMP=2+9*LDV                                                    EX1        36
      NUMPV=2+7*LTV                                                   TEST1      71
      NUMPS=2+5*LSV                                                   TEST1      72
      DO 4131 J=1,NICP                                                TEST1      73
      IF(J.GT.NMR.AND.J.GT.NMV.AND.J.GT.NMS)GO TO 4141                TEST1      74
      IF(IACT(J).EQ.0)GO TO 413                                       EXTRAD    955
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                 IF(TATR(J,NUMP).EQ.RKNIDU)TATR(J,NUMP)=RKNIDT                    TEST     162
          413    CONTINUE                                                         EXTRAD   957
                 IF(IACV(J).EQ.0)GO TO 414                                        EXTRAD   960
                 IF(VATR(J,NUMPV).EQ.RKNIDU)VATR(J,NUMPV)=RKNIDT                  TEST1     75
          414    CONTINUE                                                         EXTRAD   962
                 IF(IACS(J).EQ.0)GO TO 4131                                       TEST1     76
                 IF(SATR(J,NUMPS).EQ.RKNIDU)SATR(J,NUMPS)=RKNIDT                  TEST1     77
         4131    CONTINUE                                                         TEST1     78
         4141    DO 4161 J=1,NIC                                                  TEST1     79
                 IF(J.GT.NCEL.AND.J.GT.NVCEL.AND.J.GT.NSCEL) GO TO 4211           TEST1     80
                 IF(UP(J,NUP).EQ.0.0)GO TO 415                                    TEST     166
                 IF(UP(J,NUP).EQ.RKNIDU)JP(J,NJP)=RKNIDT                          TEST     167
          415    CONTINUE                                                         EXTRAD   966
                 IF(UV(J,NUV).EQ.0.0)GO TO 416                                    TEST     168
                 IF(UV(J,NUV).EQ.RKNIDU)JV(J,NUV)=RKNIDT                          TEST     169
          416    CONTINUE                                                         EXTRAD   970
                 IF(US(J,NUS).EQ.0.0)GO TO 4161                                   TEST     170
                 IF(US(J,NUS).EQ.RKNIDU)JS(J,NUS)=RKNIDT                          TEST     171
         4161    CONTINUE                                                         EX2       72
         4211    IF(NFC.EQ.1) GO TO 421                                           TEST1     81
                 DO 4201 LK=2,NFC                                                 TEST1     82
                 NIDFK=KDD(LK)                                                    TEST2     63
                 NIDFK=MAX0(1,NIDFK)                                              TEST2     64
                 DO 4201 JK=1,NIDFK                                               TEST2     65
                 IF(IDSLOT(JK,LK).EQ.0) GO TO 4201                                TEST1     84
                 IF(ABS(ATR(IAT,JK,LK)).EQ.RKNIDU)ATR(IAT,JK,LK)=SIGN(RKNIDT,ATR(   TEST2     66
                X IAT,JK,LK))                                                     TEST2     67
         4201    CONTINUE                                                         TEST1     86
          421    CONTINUE                                                         EXTRAD   971
                 DSI(IID)=DSI(IID)+DSI(KID)                                       EXTRAD   972
                 DSI(KID)=0.0                                                     EX1       42
                 GO TO 381                                                        EXTRAD   973
         3811    RKNIDU=ABS(CTR(KEVENT,K))                                        TEST2     68
                 NIDFK=KDD(K)                                                     TEST2     69
                 DO 3812 JK=1,NIDFK                                               TEST2     70
                 IF(ABS(ATR(IAT,JK,K)).EQ.RKNIDU)  GO TO 3813                     TEST2     71
         3812    CONTINUE                                                         TEST2     72
                 GO TO 381                                                        TEST2     73
         3813    KID=JK                                                           TEST2     74
                 GO TO 3814                                                       TEST2     75
          441    IF(KEVENT+1.GT.IEM) GO TO 451                                    TEST1     87
                 IF(IC(1,KEVENT+1,K).GT.IB(2,IEVENT,K)) GO TO 451                 TEST1     88
C                                                                                 EXTRAD   976
C                      DRAW LINE CONNECTING IC(N) TO IC(N+1).                     EXTRAD   977
C                                                                                 EXTRAD   978
                 IF(.NOT.COPLCT)GO TO 6001                                        TEST     172
                 X=FLOAT(IC(2,KEVENT,K))-1.0                                      EXTRAD   979
                 R=SCONC*X                                                        TEST     173
                 X=SCALE*(R*SINA+4.0)                                             EXTRAD   981
                 Y=SCALE*(R*COSA+4.0)                                             EXTRAD   982
                 WRITE(2)X,Y,IPU                                                  EXTRAD   984
                 X=FLOAT(IC(1,KEVENT+1,K))-1.0                                    EXTRAD   985
                 R=SCONC*X                                                        TEST1     89
                 X=SCALE*(R*SINA+4.0)                                             EXTRAD   987
                 Y=SCALE*(R*COSA+4.0)                                             EXTRAD   988
                 WRITE(2)X,Y,IPD                                                  EXTRAD   990
         6001    KEVENT=KEVENT+1                                                  TEST     175
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            IF(IID.EQ.0) GO TO 3312                                   TEST2     76
            IC(NPA,KEVENT,K)=IID                                      EXTRAD   992
            GO TO 341                                                 TEST1     92
      C                                                               EXTRAD   998
      C              RIGHT SIDE.                                      EXTRAD   999
      C                                                               EXTRAD  1000
      451   IF(.NOT.COPLOT)GO TO 6002                                 TEST     176
            X=FLOAT(IB(2,IEVENT,K))-1.0                               TEST     177
            R=SCONC*X                                                 TEST     178
            X=SCALE*(R*SINT+4.0)                                      EXTRAD  1003
            Y=SCALE*(R*COST+4.0)                                      EXTRAD  1004
            WRITE(2)X,Y,IPU                                           EXTRAD  1006
            X=FLOAT(IC(2,KEVENT,K))-1.0                               EXTRAD  1007
            R=SCONC*X                                                 TEST1     93
            X=SCALE*(R*SINA+4.0)                                      EXTRAD  1009
            Y=SCALE*(R*COSA+4.0)                                      EXTRAD  1010
            WRITE(2)X,Y,IPU                                           EXTRAD  1012
      6002  IEVENT=IEVENT+1                                           TEST     179
            KEVENT=KEVENT+1                                           EXTRAD  1015
            IF(KEVENT.GT.IEM.AND.IEVENT.GT.JEM) GO TO 601             TEST1     94
            IF(KEVENT.GT.IEM) GO TO 481                               TEST1     95
            IF(IEVENT.GT.JEM) GO TO 521                               TEST1     96
            GO TO 331                                                 EXTRAD  1016
      471   IF (IB(1,IEVENT,K).EQ.0) GO TO 521                        EXTRAD  1017
            IF (IC(1,KEVENT,K).EQ.0) GO TO 481                        EXTRAD  1018
      C                                                               EXTRAD  1019
      C              UNASSOCIATED.                                    EXTRAD  1020
      C              ANGLE LINE ON I3                                 EXTRAD  1021
      C                                                               EXTRAD  1022
            IF (IC(2,KEVENT,K).LT.I3(1,IEVENT,K)) GO TO 511           EXTRAD  1023
      481   IF(.NOT.COPLOT)GO TO 6004                                 TEST     180
            X=FLOAT(IB(1,IEVENT,K))-1.0                               TEST     182
            R=SCONC*X                                                 TEST1     97
            X=SCALE*(R*SINT+4.0)                                      EXTRAD  1026
            Y=SCALE*(R*COST+4.0)                                      EXTRAD  1027
            WRITE(2)X,Y,IPU                                           EXTRAD  1029
            X=SCALE*(R*SINA+4.0)                                      EXTRAD  1030
            Y=SCALE*(R*COSA+4.0)                                      EXTRAD  1031
            WRITE(2)X,Y,IPC                                           EXTRAD  1033
            WRITE(2)X,Y,IPU                                           EXTRAD  1034
            X=FLOAT(IB(2,IEVENT,K))-1.0                               EXTRAD  1035
            R=SCONC*X                                                 TEST1     98
            X=SCALE*(R*SINT+4.0)                                      EXTRAD  1037
            Y=SCALE*(R*COST+4.0)                                      EXTRAD  1038
            WRITE(2)X,Y,IPD                                           EXTRAD  1040
      6004  IID=IB(NPA,IEVENT,K)                                      TEST     184
            IEVENT=IEVENT+1                                           EXTRAD  1050
            IF(KEVENT.GT.IEM.AND.IEVENT.GT.JEM) GO TO 601             TEST1    101
            IF(IEVENT.GT.JEM) GO TO 521                               TEST1    102
            IF(KEVENT.GT.IEM) GO TO 481                               TEST1    103
            IF (IC(1,KEVENT,K).LE.I3(2,IEVENT,K)) GO TO 331           EXTRAD  1052
            IF (IC(2,KEVENT,K).NE.0) GO TO 501                        EXTRAD  1053
            GO TO 331                                                 EXTRAD  1054
      501   IF (IB(1,IEVENT,K).EQ.0) GO TO 521                        EXTRAD  1055
      511   IF (IC(1,KEVENT,K).GT.I3(2,IEVENT,K)) GO TO 331           EXTRAD  1056
      C                                                               EXTRAD  1057
      C              UNASSOCIATED                                     EXTRAD  1056
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      C          STRAIGHT LINE ON IC.                                    EXTRAD   1059
      C                                                                  EXTRAD   1060
  521 IF (IC(1,KEVENT,K).EQ.0) GO TO 562                                 EXTRAD   1061
      DO 5522 IIO=1,NIDF                                                 TEST      185
      IF(IDSLOT(IIO,K).NE.0)GO TO 5522                                   EXTRAD   1064
      IDO=IIO                                                            TEST      186
      IC(NPA,KEVENT,K)=IIO                                               TEST      187
      IF(K.NE.1)GO TO 5521                                               EXTRAD   1065
      IDSLOT(IIO,K)=KNID                                                 EXTRAD   1066
      KNID=KNID+1                                                        EXTRAD   1067
 5521 IE1=IC(3,KEVENT,K)                                                 TEST      188
      IID1=IC(NPA,IE1,1)                                                 TEST1     104
      IDSLOT(IIO,K)=IDSLOT(IID1,1)                                       TEST      190
      GO TO 5523                                                         TEST1     105
 5522 CONTINUE                                                           EXTRAD   1072
C** NOTE                                                                 EXTRAD   1073
C**     WHEN ALL ID,S ARE USED,                                          EXTRAD   1074
C***      IC(NIDF,K) WILL BURDEN ALL OTHER CELLS                         TEST      191
      IC(NPA,KEVENT,K)=NIDF                                              TEST1     106
      IF(K.NE.1) GO TO 5524                                              TEST2      77
      KNID=KNID+1                                                        TEST2      78
      IDSLOT(IIO,K)=KNID                                                 TEST2      79
 5524 IIO=NIDF                                                           TEST2      80
      IDO=IIO                                                            TEST2      81
      IERR=4                                                             EXTRAD   1077
 5523 KOD(K)=MAX0(KOD(K),IDO)                                            TEST2      82
      IIO=IDO                                                            TEST2      83
  524 IF(.NOT.COPLOT.OR.NA.EQ.1) GO TO 527                               TEST2      84
      X=FLOAT(IC(1,KEVENT,K))-1.0                                        TEST      193
      R=SCONC*X                                                          TEST      194
      X=SCALE*(R*SINA+4.0)                                               EXTRAD   1084
      Y=SCALE*(R*COSA+4.0)                                               EXTRAD   1085
      WRITE(2)X,Y,IPU                                                    EXTRAD   1087
      X=FLOAT(IC(2,KEVENT,K))-1.0                                        EXTRAD   1088
      R=SCONC*X                                                          TEST      195
      X=SCALE*(R*SINA+4.0)                                               EXTRAD   1090
      Y=SCALE*(R*COSA+4.0)                                               EXTRAD   1091
      WRITE(2)X,Y,IPD                                                    EXTRAD   1093
  527 IF(ISCANF.NE.0) GO TO 531                                          TEST2      85
      ATR(1,IDO,K)=DELTAZ*CI(1,KEVENT,K)+ATR(1,IDO,K)                    TEST2      86
      ATR(2,IDO,K)=DELTAZ*CI(2,KEVENT,K)+ATR(2,IDO,K)                    TEST2      87
      ATR(3,IDO,K)=SINA*DELTAZ*CI(3,KEVENT,K)+ATR(3,IDO,K)               TEST2      88
      ATR(4,IDO,K)=COSA*DELTAZ*CI(3,KEVENT,K)+ATR(4,IDO,K)               TEST2      89
  531 IE1=IC(3,KEVENT,K)                                                 EXTRAD   1102
      IID1=IC(NPA,IE1,1)                                                 EXTRAD   1103
      ATR(IAT,IDO,K)=IDSLOT(IID1,1)                                      EXTRAD   1104
      IF (NA.EQ.1) ATR(IAT,IDO,K)=-ABS(ATR(IAT,IDO,K))                   EXTRAD   1105
      IF(IC(1,KEVENT,K).LT.IMN.OR.IC(2,KEVENT,K).GE.IMX)ATR(IAT,IDO,K)=- TEST2      90
     1ABS(ATR(IAT,IDO,K))                                                EXTRAD   1107
      IF (K.NE.1) GO TO 561                                              EXTRAD   1108
      DO 551 IH=1,NZH                                                    EXTRAD   1109
      IF (HZ(2,IH,KEVENT).LE.0.) GO TO 551                               EXTRAD   1110
      IF (VI(3,IH,KEVENT).EQ.0.) GO TO 541                               EXTRAD   1111
      ZH(1,IH,NNE)=VI(1,IH,KEVENT)                                       EXTRAD   1112
      ZH(2,IH,NNE)=VI(2,IH,KEVENT)                                       EXTRAD   1113
      ZH(3,IH,NNE)=SINA*VI(1,IH,KEVENT)                                  EXTRAD   1114
      ZH(4,IH,NNE)=COSA*VI(1,IH,KEVENT)                                  EXTRAD   1115
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          ZH(5,IH,NNE)=SINA2*VI(3,IH,KEVENT)                             EXTRAD  1116
          ZH(6,IH,NNE)=COSA2*VI(3,IH,KEVENT)                             EXTRAD  1117
          ZH(7,IH,NNE)=SNACNA*VI(3,IH,KEVENT)                            EXTRAD  1118
          ZH(8,IH,NNE)=SINA*VI(3,IH,KEVENT)                              EXTRAD  1119
          ZH(9,IH,NNE)=COSA*VI(3,IH,KEVENT)                              EXTRAD  1120
          ZH(10,IH,NNE)=VI(3,IH,KEVENT)                                  EXTRAD  1121
    541   ZH(11,IH,NNE)=HZ(1,IH,KEVENT)*DELTAZ                           TEST1    109
          ZH(12,IH,NNE)=HZ(2,IH,KEVENT)*DELTAZ                           EXTRAD  1124
    551   CONTINUE                                                       EXTRAD  1125
          DSI(IDD)=DI(KEVENT)*DELTAZ                                     EXTRAD  1126
    561   CONTINUE                                                       EXTRAD  1127
    562   KEVENT=KEVENT+1                                                EXTRAD  1128
          IF(KEVENT.GT.IEM.AND.IEVENT.GT.JEM) GO TO 601                  TEST1    110
          IF(KEVENT.GT.IEM) GO TO 481                                    TEST1    111
          IF(IEVENT.GT.JEM) GO TO 521                                    TEST1    112
          GO TO 331                                                      EXTRAD  1130
    601   CONTINUE                                                       EXTRAD  1139
    611   CONTINUE                                                       EXTRAD  1140
          IF(ISCANF.NE.0) GO TO 871                                      TEST2     91
   8003   IF(.NOT.CONTRZ) GO TO 8000                                     TEST2     92
          CALL PEAKO(W,LDV,TL(1),1,UP,NCEL,TATR,NUMAX,IACT,IDC,IPTB,TB,  TEST     197
      +             IPBNT,IPRNG,4R,NMR,IPB1,IPB2,IPB3)                   TEST     198
   8000   IF(.NOT.CONTRV)GO TO 8001                                      TEST     199
          CALL PEAKO(VS,LTV,0,2,UV,NVCEL,VATR,NVMAX,IACV,IDVC,IPTVB,TVB, TEST     200
      +             IPBVNT,IPVRNG,HV,NMV,IPV1,IPV2,IPV3)                 TEST     201
   8001   IF(.NOT.CONTRS)GO TO 800                                       TEST     202
          CALL PEAKO(SV,LSV,0,0,US,NSCEL,SATR,NSMAX,IACS,IDSC,IPTSB,TSB, TEST     203
      +             IPBSNT,IPSRNG,4S,NMS,IPS1,IPS2,IPS3)                 TEST     204
C                                                                        EXTRAD  1150
C               STORE PRESENT PARAMETERS IN PREVIOUS PARAMETERS.         EXTRAD  1151
C                                                                        EXTRAD  1152
    800   CONTINUE                                                       EXTRAD  1153
          IF(ISCANF.NE.0) GO TO 8004                                     TEST2     93
          DO 801 K=1,NFC                                                 EXTRAD  1154
          JEM=IBVNT(K)                                                   TEST2     94
          IEM=ICVNT(K)                                                   TEST2     95
          IBVNT(K)=ICVNT(K)                                              EXTRAD  1155
          ICVNT(K)=0                                                     TEST2     96
          IF(JEM.EQ.0)GO TO 803                                          TEST2     97
          IEM1=MAX0(1,IEM)                                               TEST2     98
          DO 802 J=1,JEM                                                 TEST2     99
          DO 8002 I=1,IEM1                                               TEST2    100
          IF(IB(NPA,J,K).EQ.IC(NPA,I,K))GO TO 802                        TEST2    101
   8002   CONTINUE                                                       TEST2    102
          IID=IB(NPA,J,K)                                                TEST2    103
          IF(IID.LE.0) GO TO 802                                         TEST2    104
          IF(ATR(1,IID,K).GE.TATR(4)) GO TO 802                          TEST2    105
          ABAR=ATR(1,IID,K)*SCON*DELWTH(NTP+1)                           TEST2    106
          IDSLOT(IID,K)=0                                                TEST2    109
          DO 8005 I=1,IAT                                                TEST2    110
   8005   ATR(I,IID,K)=0.0                                               TEST2    111
    802   CONTINUE                                                       TEST2    112
    803   DO 801 IEVENT=1,IEMAX                                          TEST2    113
          DO 801 N=1,NPA                                                 EXTRAD  1157
          IB(N,IEVENT,K)=IC(N,IEVENT,K)                                  EXTRAD  1158
    801   IC(N,IEVENT,K)=0                                               EXTRAD  1159
C              FREE UP ATTR SPACE IF POSSIBLE                            EXTRAD  1161
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            IF(NA.NE.1) GO TO 804                               TEST2     114
            DO 805 K=1,NFC                                      TEST2     115
            IEM1=MAX0(1,IBVNT(K))                               TEST2     116
            DO 805 J=1,IEM1                                     TEST2     117
            IID=IB(NPA,J,K)                                     TEST2     118
            IF(IID.LE.0) GO TO 805                              TEST2     119
            CTR(IID,K)=ATR(IAT,IID,K)                           TEST2     120
        805 CONTINUE                                            TEST2     121
        804 CONTINUE                                            TEST2     122
            RETURN                                              EXTRAD   1174
      C                                                         EXTRAD   1175
      C                                                         EXTRAD   1176
            ENTRY CONTR2                                        EXTRAD   1177
            IF(ISCANF.NE.1) ISCANF=-1                           TEST2     123
            GO TO 8003                                          TEST2     124
       8004 IF(ISCANF.GT.0) GO TO 831                           TEST2     125
            DO 821 K=1,NFC                                      EXTRAD   1179
            IE=IBVNT(K)                                         EXTRAD   1180
            IF(IE.LE.0)GO TO 821                                TEST      206
            DO 822 I=1,IE                                       TEST      207
            IDD=IB(NPA,IE,K)                                    TEST2     126
        822 ATR(IAT,IDD,K)=-ABS(ATR(IAT,IDD,K))                 TEST2     127
            DO 823 I=1,IEM1                                     TEST2     128
            DO 823 J=1,NIDF                                     TEST2     129
            IF(ABS(CTR(I,K)).NE.ABS(ATR(IAT,J,K))) GO TO 823    TEST2     130
            ATR(IAT,J,K)=-ABS(ATR(IAT,J,K))                     TEST2     131
        823 CONTINUE                                            TEST2     132
        821 CONTINUE                                            TEST      210
      C             PLOT FINAL RADIALS.                         EXTRAD   1184
            IF(.NOT.COPLOT)GO TO 871                            TEST      211
            X=SCALE*4.                                          TEST2     133
            Y=X                                                 TEST2     134
            WRITE(2)X,Y,IPU                                     EXTRAD   1188
            SCRA=SCONC/ICOMP                                    TEST1     117
            R=SCRA*(RN(NRC+1)-.5)                               TEST      213
            X=SCALE*(R*SIN(AZMUTH(1)*RPD)+4.0)                  EXTRAD   1192
            Y=SCALE*(R*COS(AZMUTH(1)*RPD)+4.0)                  EXTRAD   1193
            WRITE(2)X,Y,IPD                                     EXTRAD   1195
            X=SCALE*(R*SIN(AZMUTH(NA)*RPD)+4.0)                 EXTRAD   1196
            Y=SCALE*(R*COS(AZMUTH(NA)*RPD)+4.0)                 EXTRAD   1197
            WRITE(2)X,Y,IPU                                     EXTRAD   1199
            X=SCALE*4.                                          TEST2     135
            Y=X                                                 TEST2     136
            WRITE(2)X,Y,IPD                                     EXTRAD   1203
            GO TO 871                                           EXTRAD   1204
        831 TEMP=AZMUTH(NA)*RPD                                 TEST2     137
            DELTAZ=ABS(AZMUTH(1)*RPD-TEMP)                      TEST2     138
            AZNOW=AZMUTH(1)                                     EXTRAD   1215
            DO 8611 IX=1,NCL                                    EXTRAD   1218
            W(IX)=WI(IX)                                        EXTRAD   1219
            SV(IX)=SVI(IX)                                      TEST      214
       8611 VS(IX)=VSI(IX)                                      EXTRAD   1220
            GO TO 61                                            TEST2     139
        871 DELR=SCON*CELWTH(NTP+1)                             EXTRAD   1222
            DACEL=DELR*DAZM*1.E-3                               TEST1     118
            IF(IERR .EQ. 0) GOTO 8711                           EXTRAD   1223
            IF(IERR .EQ. 1) PRINT 8712,5HNCELL,5HPEAKD          EXTRAD   1224
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            IF(IERR .EQ. 2) PRINT 8712,5HIADDR,4HIUPK                          EXTRAD   1225
            IF(IERR .EQ. 3) PRINT 8712,5HIADDR,3HIPK                           EXTRAD   1226
            IF(IERR .EQ. 4) PRINT 8712,3HNID,5HCONTR                           EXTRAD   1227
      8712  FORMAT(2X,*ARRAY OVERFLOW*,2X,*VARIABLE*,2X,A5,2X,*IN*,2X,A5)      EXTRAD   1228
C                                                                              EXTRAD   1229
C           WRITE FIXED CONTOR ATRIBUTES                                       EXTRAD   1230
C                                                                              EXTRAD   1231
      8711  IF(KNID.LE.1)GO TO 1413                                            EX1        47
            CALL PAGE                                                          EX1        48
            WRITE(6,872)                                                       EXTRAD   1233
       872  FORMAT(1H ,* FIXED CONTOUR ATTRIBUTES*)                            EXTRAD   1234
            WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)       TEST1     119
            WRITE(6,712)                                                       EXTRAD   1235
       712  FORMAT(/,28X,7HAVERAGE,7X,8HLOCATION,13X,4HAREA,8X,5HTOTAL,3X,     TEST1     120
           17HAVERAGE,6X,5HFIXED,/,3X,9HTHRESHOLD,5X,4HAREA,2X,12HREFLECTIVITY TEST1     121
           2,1X,4HEAST,2X,5HNORTH,5X,5HRANGE,1X,10HRESOLUTION,2X,6HPRECIP,4X,  TEST1     122
           36HPRECIP,6X,6HCONTOR,/,2X,2HID,4X,5H(DBZ),4X,7H(KM**2),4X,5H(DBZ), TEST1     123
           45X,4H(KM),3X,4H(KM),7X,4H(KM),1X,8HELEMENTS,2X,9H(TONS/HR),1X,     TEST1     124
           57H(MM/HR),4X,9HREFERENCE)                                          TEST1     125
            IF(.NOT.VOLTAP)GO TO 6019                                          TEST      215
            ITYPE=0                                                            EXTRAD   1241
            WRITE (3) ITYPE,ITYPE                                              EXTRAD   1242
            WRITE(3)ELEVAT,IDAY,IHOUR,IMIN,ISEC,AZMUTH(1),AZMUTH(NA)           TEST      216
           X,NEL                                                               TEST2     140
      6019  DO 931 K=1,NFC                                                     TEST      217
C CALAULATE NUMBER OF CONTOURS FOR LOWEST LEVEL                                EXTRAD   1247
            NIDK=KCC(K)                                                        TEST1     126
            IF(.NOT.VOLTAP) GO TO 9333                                         TEST1     127
            ITYPE=K                                                            TEST1     128
            ICOUNT=0                                                           TEST1     129
            DO 9311 J=1,NIDK                                                   TEST      219
            IF(IDSLOT(J,K).NE.0)ICOUNT=ICOUNT+1                                EXTRAD   1250
      9311  CONTINUE                                                           EXTRAD   1251
            IF(VOLTAP)WRITE(3)ITYPE,ICOUNT                                     TEST      220
      9333  CONTINUE                                                           EXTRAD   1253
      6020  DO 9312 J=1,NIDK                                                   TEST      221
            IF(IDSLOT(J,K).EQ.0)GO TO 9312                                     EXTRAD   1255
            KNIDO=ATR(IAT,J,K)                                                 EXTRAD   1259
            IDI=J                                                              EXTRAD   1260
            IF(ATR(1,J,K).LT.TATRMN) GO TO 9312                                TEST2     141
            ABAR=DELR*ATR(1,J,K)                                               EXTRAD   1262
            ZBAR=ATR(2,J,K)*DELR/ABAR                                          EXTRAD   1263
            XBAR=ATR(3,J,K)*DELR/ABAR/ZBAR                                     EXTRAD   1264
            YBAR=ATR(4,J,K)*DELR/ABAR/ZBAR                                     EXTRAD   1265
            ABAR=ABAR/1000**2                                                  EXTRAD   1266
            XBAC=XBAR/1000.                                                    EXTRAD   1267
            YBAC=YBAR/1000.                                                    EXTRAD   1268
            RBAR=SQRT(XBAC*XBAC+YBAC*YBAC)                                     TEST1     130
            RCELLS=ABAR/(RBAR*DACEL)                                           TEST1     131
            ZBAR=10.*ALOG10(ZBAR)                                              EXTRAD   1269
            IF(K-1) 9313,9313,9315                                             TEST2     142
      9313  IF(NEL-1) 9314,9314,9315                                           TEST2     143
      9314  TPREC=CSI(J)*DELR                                                  TEST2     144
            AVPREC=TPREC/(ABAR*1000**2)                                        EXTRAD   1274
            TPREC=TPREC/10E05                                                  EXTRAD   1275
            WRITE(6,716) IDI,TL(K),ABAR,ZBAR,XBAC,YBAC,RBAR,RCELLS,TPREC,      TEST1     135
           XAVPREC,KNIDO                                                       TEST1     136
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  716 FORMAT(1X,I3,5X,I2,4X,F3.2,4X,F5.1,4X,F6.1,1X,F6.1,2F10.1,          TEST1     137
     X1X,F8.2,2X,F6.2,4X,I6)                                            TEST1     138
      IF(VOLTAP) WRITE(3)K,TL(K),ABAR,ZBAR,XBAC,YBAC,TPREC,AVPREC,KNIDQ TEST1     139
      GO TO 9316                                                        TEST2     145
 9315 WRITE(6,720) ID1,TL(K),ABAR,ZBAR,XBAC,YBAC,RBAR,RCELLS,KNIDQ      TEST2     146
  720 FORMAT(1X,I3,5X,I2,4X,F3.2,4X,F5.1,4X,F6.1,1X,F6.1,2F10.1,21X,I6) TEST2     147
      IF(VOLTAP) WRITE(3) K,TL(K),ABAR,ZBAR,XBAC,YBAC,KNIDQ             TEST2     148
 9316 IF(.NOT.COPLOT) GO TO 9312                                        TEST2     149
      XBAR=XBAC/RANG+4.                                                 TEST1     141
      YBAR=YBAC/RANG+4.                                                 TEST1     142
      IPU=IVDP+ID1+(K-1)*10000                                          TEST2     150
      WRITE(2)XBAR,YBAR,IPU                                             EXTRAD   1283
 9312 CONTINUE                                                          EXTRAD   1284
  931 CONTINUE                                                          EXTRAD   1285
C                                                                       EXTRAD   1286
C         WRITE WIND DATA                                               EXTRAD   1287
C                                                                       EXTRAD   1288
      CALL PAGE                                                         EXTRAD   1289
      WRITE(6,711)                                                      EXTRAD   1290
  711 FORMAT(10H WIND DATA)                                             EXTRAD   1291
      WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)      TEST1     143
      M=NNF                                                             EXTRAD   1292
      WRITE(6,713)                                                      EXTRAD   1293
      DO 921 I=1,NZH                                                    EXTRAD   1294
      IF(ZH(NZP,I,M).EQ.0)GO TO 921                                     EXTRAD   1295
      TZ=DELR*ZH(11,I,M)                                                EXTRAD   1296
      AVZ=ZH(11,I,M)/ZH(12,I,M)                                         EXTRAD   1297
      IF(AVZ.GT.0.)AVZ=10.*ALOG10(AVZ)                                  EX1        50
C                COMPUTE AVG WIND SPEED AND DIR.                        EXTRAD   1299
      DEL=ZH(5,I,M)*ZH(6,I,M)-ZH(7,I,M)*ZH(7,I,M)                       EXTRAD   1300
      IF (DEL.EQ.0.) GO TO 921                                          EXTRAD   1301
      VN=(ZH(4,I,M)*ZH(5,I,M)-ZH(3,I,M)*ZH(7,I,M))/DEL/VQUANT           EXTRAD   1302
      VE=(ZH(6,I,M)*ZH(3,I,M)-ZH(7,I,M)*ZH(4,I,M))/DEL/VQUANT           EXTRAD   1303
      VER=(ZH(2,I,M)+VN*VN*ZH(6,I,M)+VE*VE*ZH(5,I,M)+2.0*VN*VE*ZH(7,I,M) EXTRAD  1304
     1-2.0*VN*ZH(4,I,M)-2.0*VE*ZH(3,I,M))/ZH(10,I,M)/VQUANT/VQUANT      EXTRAD   1305
C     VF=ZH(5,I,M)/ZH(10,I,M)-(ZH(8,I,M)/ZH(10,I,M))                    EXTRAD   1306
C     VC=ZH(6,I,M)/ZH(10,I,M)-(ZH(9,I,M)/ZH(10,I,M))**2                 EXTRAD   1307
  713 FORMAT(1H0,10X,7HAVERAGE,6X,5HTOTAL,5X,7HAVERAGE,1X,7HAVERAGE,2X, EXTRAD   1308
     X8HVELOCITY/1X,6HHEIGHT,1X,12HREFLECTIVITY,1X,12HREFLECTIVITY,4X,  EXTRAD   1309
     X1HU,7X,1HV,5X,8HVARIANCE,14X,3HDEL/                               EXTRAD   1310
     X         2X,4H(KM),5X,5H(DBZ),6X,11H(DBZ.KM**2),1X,7H(M/SEC),1X,  EXTRAD   1311
     X7H(M/SEC),1X,11H(M/SEC)**2))                                      EXTRAD   1312
      TZ=TZ/10E05                                                       EXTRAD   1313
      WRITE(6,717)I,AVZ,TZ,VE,VN,VER,DEL                                EXTRAD   1314
  717 FORMAT(I5,6X,F5.1,7X,F9.1,2X,F6.1,2X,F6.1,2X,F10.1,1X,E15.5)      EXTRAD   1315
  921 CONTINUE                                                          EXTRAD   1316
C                                                                       EXTRAD   1317
C         WRITE PEAK CELL ATTRIBUTES                                    EXTRAD   1318
C                                                                       EXTRAD   1319
      IF(.NOT.CONTRZ)GO TO 6010                                         TEST      228
      CALL PAGE                                                         EXTRAD   1320
      WRITE(6,932)                                                      EXTRAD   1321
  932 FORMAT(1H ,* PEAK DETECTED CELL ATTRIBUTES*)                      EXTRAD   1322
      WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)      TEST1     144
      WRITE(6,714)                                                      EXTRAD   1323
  714 FORMAT(/,60X,7HAVERAGE,3X,7HAVERAGE,3X,7HAVERAGE,3X,7HAVERAGE,5X, TEST1     145
     X4HMEAN,/,32X,                                                     TEST1     146
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     1 8HLOCATION,11X,4HAREA,5X,8HVELOCITY,2X,6HRADIAL,6X,10HTANGENTIAL,  TEST1    147
     22X,6HRADIAL,4X,5HFIXED,/,6X,12HREFLECTIVITY,3X,4HAREA,3X,4HEAST,    TEST1    148
     32X,5HNORTH,2X,5HRANGE,2X,10HRESOLUTION,2X,6HSPREAD,6X,5HSHEAR,5X,   TEST1    149
     45HSHEAR,7X,8HVELOCITY,2X,7HCONTOUR,/,2X,2HID,5X,5H(DBZ),5X,         TEST1    150
     57H(KM**2),2X,4H(KM),3X,4H(KM),3X,4H(KM),2X,8HELEMENTS,5X,5H(M/S),   TEST1    151
     65X,8H(M/S/KM),3X,8H(M/S/KM),4X,5H(M/S),5X,9HREFERENCE)              TEST1    152
      IF(.NOT.VOLTAP)GO TO 6021                                           TEST     229
      ITYPE=3                                                             TEST1    153
      ICOUNT=0                                                            EXTRAD  1331
C CALCULATE NUMBER OF PEAK RAIN CELLS                                     EXTRAD  1332
      DO 9333 IX=1,NCEL                                                   EXTRAD  1333
      IF(UP(IX,1).LE.0. .OR. JP(IX,2) .EQ. 0.)GO TO 9333                  TEST     230
      ICOUNT=ICOUNT+1                                                     EXTRAD  1335
 9333 CONTINUE                                                            EXTRAD  1336
      WRITE (3) ITYPE,ICOUNT                                              EXTRAD  1337
 6021 DO 933 N=1,NCEL                                                     TEST     231
      IF(UP(N,1).LE.0..OR.UP(N,2).EQ.0.)GO TO 933                         TEST     232
      UP(N,3)=UP(N,3)/UP(N,2)/10E02                                       TEST     233
      UP(N,4)=UP(N,4)/UP(N,2)/10E02                                       TEST     234
      UP(N,2)=UP(N,2)/UP(N,1)/ZQUANT                                      TEST     235
      UP(N,5)=UP(N,5)/UP(N,1)/SQUANT                                      TEST     236
      UP(N,8)=UP(N,8)/UP(N,1)/VQUANT                                      TEST     237
      UP(N,6)=UP(N,6)/UP(N,1)/VQUANT                                      TEST     238
      UP(N,1)=UP(N,1)*DELR/1.E06                                          TEST     239
      RBAR=SQRT(UP(N,3)*UP(N,3)+UP(N,4)*UP(N,4))                          TEST1    154
      RCELLS=UP(N,1)/(RBAR*DAZEL)                                         TEST1    155
      UP(N,7)=UP(N,7)/UP(N,1)*1.0E-3/VQUANT                               TEST     240
      IUP=UP(N,9)                                                         TEST     241
      WRITE(6,718) N,UP(N,2),JP(N,1),UP(N,3),UP(N,4),RBAR,RCELLS,UP(N,5)  TEST1    156
     X,UP(N,7),UP(N,6),UP(N,8),IUP                                        TEST1    157
      IF(VOLTAP)WRITE(3)UP(N,2),UP(N,1),UP(N,3),UP(N,4),UP(N,5),UP(N,7),  TEST     244
     +UP(N,6),UP(N,8),IUP                                                 TEST     245
      IF(.NOT.COPLOT)GO TO 933                                            TEST     246
      XREG=UP(N,3)/RANG+4.0                                               TEST1    158
      YREG=UP(N,4)/RANG+4.0                                               TEST1    159
      IPU=ITUP+N                                                          TEST     249
      WRITE(2)XREG,YREG,IPU                                               TEST     250
  718 FORMAT(I4,5X,F5.1,6X,F6.1,1X,F6.1,1X,F6.1,1X,F6.1,3X,F6.1,3X,F7.2,  TEST1    160
     X3X,F7.2,3X,F7.2,5X,F7.2,3X,I4)                                      TEST1    161
  933 CONTINUE                                                            EXTRAD  1358
C                                                                         EXTRAD  1359
C        WRITE TANG SHEAR ATTRIBUTES                                      EXTRAD  1360
C                                                                         EXTRAD  1361
 6010 IF(.NOT.CONTRV)GO TO 6011                                           TEST     251
      CALL PAGE                                                           EXTRAD  1362
      WRITE(6,942)                                                        EXTRAD  1363
  942 FORMAT(1H ,* TANGENTIAL SHEAR MAXIMA ATTRIBUTES*)                   EXTRAD  1364
      WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)        TEST     252
  945 FORMAT(/,1X,4H DAY,2X,4HHHMM,2X,2HSS,5X,3HELE,5X,5HAZM1 ,5X,        TEST     253
     +   5HAZM2 ,/,1X,I4,2X,2I2,1X,I3,2X,F6.1,5X,F5.1,5X,F5.1)            TEST     254
      WRITE(6,715)                                                        EXTRAD  1365
  715 FORMAT(/,60X,*AVERAGE*,15X,*FIXED*,/,7X,*MAGNITUDE*,15X,            TEST1    162
     X*LOCATION*,                                                         TEST1    163
     115X,*AREA*,2X,*VELOCITY*,3X,*AVERAGE*,4X,*CONTOUR*,/,               TEST1    164
     29X,*SHEAR*,6X,*AREA*,4X,*EAST*,3X,*NORTH*,3X,*RANGE*,2X,            TEST1    165
     3*RESOLUTION*,1X,*SPREAD*,5X,*SHEAR*,4X,*REFERENCE*,/,2X,*ID*,3X,    TEST1    166
     4*(M/S/KM)*,3X,7H(KM**2),3X,*(KM)*,4X,*(KM)*,4X,*(KM)*,4X,           TEST1    167
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      5*ELEMENTS*,1X,*(M/S)*,5X,8H(M/S/KM))                          TEST1     166
      IF(.NOT.VOLTAP)GO TO 6022                                       TEST      255
      ITYPE=4                                                         TEST1     169
      ICOUNT=0                                                        EXTRAD   1370
C CALCULATE NUMBER OF PEAK VELOCITY CELLS                              EXTRAD   1371
      DO 9943 IX=1,NVCEL                                              EXTRAD   1372
      IF(UV(IX,1).LE.0..OR.UV(IX,2).EQ.0.)GO TO 9943                  TEST      256
      ICOUNT=ICOUNT+1                                                 EXTRAD   1374
 9943 CONTINUE                                                        EXTRAD   1375
      WRITE (3) ITYPE,ICOUNT                                          EXTRAD   1376
 6022 DO 943 N=1,NVCEL                                                TEST      257
      IF(UV(N,1).LE.0.0.OR.UV(N,2).EQ.0.)GO TO 943                    TEST      258
      UV(N,4)=UV(N,4)/UV(N,2)/1.0E03                                  TEST      259
      UV(N,3)=UV(N,3)/UV(N,2)/1.0E03                                  TEST      260
      UV(N,2)=UV(N,2)/UV(N,1)/VQUANT                                  TEST      261
      UV(N,5)=UV(N,5)/UV(N,1)/SQUANT                                  TEST      262
      UV(N,6)=UV(N,6)/UV(N,1)/VQUANT                                  TEST      263
      UV(N,1)=UV(N,1)*DELR/1.0E06                                     TEST      264
      RBAR=SQRT(UV(N,3)*UV(N,3)+UV(N,4)*UV(N,4))                      TEST1     170
      RCELLS=UV(N,1)/(RBAR*DACE_)                                     TEST1     171
      IUV=UV(N,7)                                                     TEST      265
      WRITE(6,719) N,UV(N,2),UV(N,1),UV(N,3),UV(N,4),RBAR,RCELLS,     TEST1     172
     XUV(N,5),UV(N,6),IUV                                             TEST1     173
      IF(VOLTAP)WRITE(3)UV(N,2),UV(N,1),UV(N,3),UV(N,4),UV(N,5),UV(N,6),  TEST  267
     +IUV                                                             TEST      268
      IF(.NOT.COPLOT)GO TO 943                                        TEST      269
      XREG=UV(N,3)/RANG+4.0                                           TEST1     174
      YREG=UV(N,4)/RANG+4.0                                           TEST1     175
      IPU=ISUP+N                                                      TEST      272
      WRITE(2)XREG,YREG,IPU                                           TEST      273
  719 FORMAT(1X,I4,2X,F7.1,3X,F7.1,1X,F7.1,1X,F7.1,3X,F7.1,F7.1,      TEST1     176
     X3X,F7.1,3X,F7.1,4X,I4)                                          TEST1     177
  943 CONTINUE                                                        EXTRAD   1391
C                                                                     EX2       110
C        OUTPUT SPREAD CELLS                                          EX2       111
C                                                                     EX2       112
 6011 IF(.NOT.CONTRS)GO TO 1413                                       TEST      275
      CALL PAGE                                                       EX2       113
      WRITE(6,9950)                                                   EX2       114
 9950 FORMAT(1H ,*VELOCITY SPREAD MAXIMA ATTRIBUTES*)                  EX2       115
      WRITE(6,945)IDAY,IHOUR,IMIN,ISEC,ELEVAT,AZMUTH(1),AZMUTH(NA)    TEST      276
      WRITE(6,9951)                                                   EX2       116
 9951 FORMAT(/,30X,*LOCATION*,13X,*AREA*,9X,*FIXED*,/,1X,             TEST1     178
     12HID,4X,*SPREAD*,5X,*AREA*,3X,*EAST*,3X,*NORTH*,3X,*RANGE*,     TEST1     179
     22X,*RESOLUTION*,5X,*CONTOUR*,/,7X,*(M/S)*,6X,*(KM2)*,2X,        TEST1     180
     3*(KM)*,3X,*(KM)*,4X,*(KM)*,3X,*ELEMENTS*,7X,*REFERENCE*)        TEST1     181
      IF(.NOT.VOLTAP)GO TO 6023                                       TEST      277
      ITYPE=5                                                         TEST1     182
      ICOUNT=0                                                        EX2       120
      DO 9944 IX=1,NSCEL                                              EX2       121
      IF(US(IX,1).LE.0..OR.US(IX,2).EQ.0)GO TO 9944                   TEST      279
      ICOUNT=ICOUNT+1                                                 EX2       123
 9944 CONTINUE                                                        EX2       124
      WRITE (3) ITYPE,ICOUNT                                          EX2       125
 6023 DO 944 N=1,NSCEL                                                TEST      280
      IF(US(N,1).LE.0..OR.US(N,2).EQ.0.)GO TO 944                     TEST      281
      US(N,4)=US(N,4)/US(N,2)/1.0E03                                  TEST      282
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                 US(N,3)=US(N,3)/US(N,2)/1.0E03                      TEST      283
                 US(N,2)=US(N,2)/US(N,1)/SQUANT                      TEST      284
 915             US(N,1)=US(N,1)*DELR/1.0E06                         TEST      285
                 RBAR=SQRT(US(N,3)*US(N,3)+US(N,4)*US(N,4))          TEST1     183
                 RCELLS=US(N,1)/(RBAR*DASEL)                         TEST1     184
                 IUS=US(N,5)                                         TEST      266
                 WRITE(6,721) N,US(N,2),JS(N,1),US(N,3),US(N,4),RBAR,RCELLS,IUS  TEST1  185
 920        721  FORMAT(I4,1X,F7.1,3X,F6.1,2X,F6.1,1X,F6.1,3X,F7.1,2X,F7.1,5X,I4)  TEST1  186
                 IF(VOLTAP)WRITE(3)US(N,2),US(N,1),US(N,3),JS(N,4),IUS  TEST    289
                 IF(.NOT.COPLOT)GO TO 944                            TEST      290
                 XREG=US(N,3)/RANG+4.0                               TEST1     187
                 YREG=US(N,4)/RANG+4.0                               TEST1     188
 925             IPU=ISSP+N                                          TEST      293
                 WRITE(2)XREG,YREG,IPU                               TEST      294
            944  CONTINUE                                            EX2       140
           1413  WRITE(6,950)KNID,NMR,NMW,NMS                        TEST      295
            950  FORMAT(1H0,10HTOTAL IDD=,4I6)                       TEST      296
 930             ISCANF=0                                            EXTRAD   1394
                 IF(PRINT2) CALL PRN2(2)                             TEST1     189
                 RETURN                                              EXTRAD   1398
                 END                                                 EXTRAD   1399
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      SUBROUTINE PEAKD(U,LDB,TN,ITY,UP,NCELL,TATR,NJMAX,IACT,IDC,IPTB,   TEST       298
     +TB,IPBNT,IPCRNG,HB,NMX,IPB1,IPB2,IPB3)                              TEST       299
C$    DEBUG                                                               EXTRAD    1403
C$    ARRAYS                                                              EX2        141
C     ******************************************************************* EXTRAD    1405
C     VERSION 1.0   LEVEL 770112                                          EXTRAD    1406
C     JHW   AFGL 6600                                                     EXTRAD    1407
C     DETERMINES PEAK VALUES AND THEIR ATTRIBUTES.                        EXTRAD    1408
C     ******************************************************************* EXTRAD    1409
      REAL UP(200,9),TATR(70,29)                                          TEST       300
      INTEGER U(173),HB(173),IACT(70),IDC(22),IPTB(22),TB(30,22),         TEST       301
     +IPBNT(30,22),IPCRNG(60),IPB1(2640),IPB2(2640),IPB3(2640),TM         TEST       302
      INTEGER W,WI,WR                                                     TEST       303
      INTEGER V,VB,VS,SV,VSI,SVI,HV,HS                                    TEST       304
      INTEGER TV,TSV,TL,T,TC                                              TEST1      190
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB,    TEST       306
     +JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,IR,JR,KR,IMXJMX         TEST       307
      COMMON/REFL/W(173),WI(173),VJ(173),HR(173),NNCL,NID,NIDP,NCL        TEST2      151
     X,IMX,IMN                                                            TEST2      152
      COMMON /VEL/ V(173),VB(173),VS(173),SV(173),VSI(173),SVI(173),      TEST       309
     +HV(173),HS(173)                                                     TEST       310
      COMMON /FIXED/ IC(4,22,2),IB(4,22,2),NPA,IEMAX,NFC,ICVNT(2),        TEST       311
     +           IBVNT(2),KTR(5,120,2),IKT,NIDF,KDJ(2),IDSLOT(120,2)      TEST       312
C     ------------------------------------------------------------------- EXTRAD    1420
      COMMON /STORE/ AE,AA,BB,SL,CL,TV,TSV                                EXTRAD    1421
      COMMON/INSUB/ TL(2),LT,TDW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)     TEST1      191
     1,ICCMP,VMIN,SVMIN,ESTART,DELT                                       TEST2      153
      COMMON/AZM/ AZMUTH(460),NA,ELEVAT,PRF,KEEP                          EXTRAD    1425
      COMMON /ADATA/ IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NDD,NRC                 EXTRAD    1426
      COMMON /AZ2/SAZ,CAZ,DAZ,ISCANF,NEL                                  EXTRAD    1429
      COMMON/FILTER/TATRMN,AREAMN,DAZM                                    TEST1      192
      COMMON  /ERROR/ IERR                                                EXTRAD    1432
      DATA IZERO/0/                                                       EXTRAD    1433
C     ------------------------------------------------------------------- EXTRAD    1434
C                                                                         EXTRAD    1435
C             IEM IS NO.OF EVENTS IN C RADIAL.                            EXTRAD    1436
C             INITIALIZE AND GENERATE HC ARRAY                            EXTRAD    1437
C                                                                         EXTRAD    1438
      SCONC=SCON*CELWTH(NTP+1)                                            EXTRAD    1439
      NAX=NA                                                              EXTRAD    1440
      IEM=ICVNT(1)                                                        EXTRAD    1441
      IFLAG=0                                                             TEST1      193
C                                                                         EX2        147
C        ITY = 0  HAVE NORMAL                                             EX2        148
C        ITY = 1   HAVE REFLECTIVITY + SHEAR + SPREAD                     EX2        149
C        ITY = 2   HAVE SHEAR + SPREAD                                    EX2        150
      LM=5                                                                EX2        151
      IF(ITY.EQ.1)LM=9                                                    EX2        152
      IF(ITY.EQ.2)LM=7                                                    TEST       314
      LMM=LM-1                                                            EXTRAD    1444
      IDX=LM+1                                                            EXTRAD    1445
      NCLM=NCL-1                                                          EXTRAD    1446
      LDMX=(NUMAX-2)/LM                                                   EXTRAD    1447
      IF (LDB.GT.LDMX) LDB=LDMX                                           EXTRAD    1448
      LDBM=LDB-1                                                          EXTRAD    1449
      NJMP=2+LM*LDB                                                       EXTRAD    1450
      LDX=NJMP-1                                                          EXTRAD    1451
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               IDZ=I+(LDB-1)*LM                                        EXTRAD   1452
               IF(NA.NE.1.OR.ISCANF.NE.0)GO TO 2109                    EX1        59
        C                                                              EXTRAD   1454
        C                 ZERO ARRAYS                                  EXTRAD   1455
        C                                                              EXTRAD   1456
               NMX=1                                                   EX1        60
               DO 2108 I=1,NICP                                        EX1        61
               IACT(I)=0                                               EX1        62
               DO 2108 J=1,NUMAX                                       EX1        63
        2108   TATR(I,J)=0.                                            TEST      315
        2109   NGM=0                                                   EX1        65
               DO 21 I=1,IEMAX                                         EXTRAD   1457
               IPTC(I)=0                                               EXTRAD   1458
               DO 21 K=1,KMAX                                          EXTRAD   1459
               TC(K,I)=0                                               EXTRAD   1460
          21   IPCNT(K,I)=0                                            EXTRAD   1461
               DO 22 J=1,IAMAX                                         EXTRAD   1462
               IPC1(J)=0                                               EXTRAD   1463
               IPC2(J)=0                                               EXTRAD   1464
          22   IPC3(J)=0                                               EXTRAD   1465
        C                                                              EXTRAD   1466
        C                 OUTER C EVENT LOOP                           EXTRAD   1467
        C                                                              EXTRAD   1468
         1044  JEM=IBVNT(1)                                            TEST1     194
               IF(IEM.LE.0) GO TO 952                                  TEST1     195
               IF(IEM.GT.KR)IEM=KR                                     EX1        66
               DO 951 IE=1,IEM                                         EXTRAD   1470
               IID1=IC(NPA,IE,1)                                       EXTRAD   1471
               IF(IID1.NE.0)GO TO 9510                                 TEST1     196
               WRITE(6,9511)IID1                                       TEST1     197
         9511  FORMAT(* IID1=*,I10)                                    TEST1     198
               GO TO 951                                               TEST1     199
         9510  CONTINUE                                                TEST1     200
               IF(NA .EQ. 1 .AND. ISCANF .EQ. 1) GO TO 940             EXTRAD   1472
               IPL=0                                                   TEST1     201
               IF(IE.GT.1)IPL=IDC(IE-1)                                TEST1     202
               IP=IDC(IE)                                              EXTRAD   1474
               IF(IP.EQ.0.OR.IPL.EQ.IP) GO TO 951                      TEST1     203
               IF(IPL.LE.0) IPL=1                                      TEST1     204
               IF(IP.GT.JMAX)IP=JMAX                                   EX1        67
               JE1=0                                                   EXTRAD   1476
               JE2=0                                                   EXTRAD   1477
        C                                                              EXTRAD   1478
        C                 FIND B EVENTS ASSOCIATED WITH C EVENTS.      EXTRAD   1479
        C                 JEM IS NO. OF EVENTS IN PREVIOUS RADIAL.     EXTRAD   1480
        C                                                              EXTRAD   1481
               IF(JEM .EQ. 0) GO TO 41                                 EXTRAD   1483
               IF(JEM.GT.KR)JEM=KR                                     EX1        68
               DO 31 JE=1,JEM                                          EXTRAD   1484
               IF(IB(2,JE,1) .LT. IC(1,IE,1)) GO TO 31                 EXTRAD   1485
               IF(IB(1,JE,1) .GT. IC(2,IE,1)) GO TO 41                 EXTRAD   1486
               JE2=JE                                                  EXTRAD   1487
               IF (JE1.EQ.0) JE1=JE                                    EXTRAD   1488
          31   CONTINUE                                                EXTRAD   1489
        C                                                              EXTRAD   1490
        C                 FIND THRESHOLDS FOR IE EVENT                 EXTRAD   1491
        C                                                              EXTRAD   1492
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  41   DO 51 J=1,JMXDB                                   EXTRAD  1493
  51   T(J)=0                                            EXTRAD  1494
       NTHRES=1                                          EX1       69
       IF(IP.LT.IPL) GO TO 951                           TEST1    205
       DO 71 L=IPL,IP                                    EXTRAD  1495
       IR1=IPCRNG(L)                                     TEST     316
       IF(IR1.LE.0.OR.IR1.GE.NSL)GO TO 951               TEST     317
       IF(IR1.LT.IC(1,IE,1))GO TO 71                     TEST     318
       IF(IR1.GT.IC(2,IE,1))GO TO 712                    TEST     320
       DO 711 K=1,LDB                                    TEST     321
       IT=IABS(U(IR1))-IM-K+1                            EXTRAD  1499
       IF(IT.LE.0)GO TO 711                              TEST     322
       IF(IT.GT.JMXDB)IT=JMXDB                           EX1       71
       IF(T(IT).EQ.0)NTHRES=NTHRES+1                     EX1       72
       T(IT)=1                                           EX1       73
 711   CONTINUE                                          TEST     323
  71   CONTINUE                                          TEST     324
 712   IPSRT=0                                           TEST     325
       IF(NTHRES.GT.KMAX)IPSRT=NTHRES-KMAX               EX1       75
       IPT=1                                             EXTRAD  1502
       DO 91 L=1,JMXDB                                   EXTRAD  1503
       IF  (T(L)) 91,91,81                               EXTRAD  1504
   81  TC(IPT,IE)=L+IM-1                                 EXTRAD  1505
       IPSRT=IPSRT-1                                     EX1       76
       IF(IPSRT.GT.0)GO TO 91                            EX1       77
       IPT=IPT+1                                         EXTRAD  1506
  91   CONTINUE                                          EXTRAD  1507
       IPT=IPT-1                                         EXTRAD  1508
       IF(IPT.GE.JR)IPT=JR                               EX1       78
       IPTC(IE)=IPT                                      EXTRAD  1509
       IF(IPT.LE.0)GO TO 951                             EXTRAD  1510
C                                                        EXTRAD  1511
C            LOOP ON RANGE IN IE EVENT TO FIND CONTOUR   EXTRAD  1512
C                                                        EXTRAD  1513
       IBGN=IC(1,IE,1)+1                                 EXTRAD  1514
       IND=IC(2,IE,1)+1                                  EXTRAD  1515
       DO 161 I=IBGN,IND                                 EXTRAD  1516
C                                                        EXTRAD  1517
C            LOOP ON THRESHOLD                           EXTRAD  1518
C                                                        EXTRAD  1519
 101   DO 131 K=1,IPT                                    EXTRAD  1520
       IF  (U(I).EQ.-999) GO TO 141                      EXTRAD  1521
       IF  (IABS(U(I)).GT.TC(K,IE)) GO TO 111            EXTRAD  1522
       GO TO 141                                         EXTRAD  1523
 111   IF  (U(I-1).EQ.-999) GO TO 121                    EXTRAD  1524
       IF  (IABS(U(I-1)).LE.TC(K,IE)) GO TO 121          EXTRAD  1525
       GO TO 131                                         EXTRAD  1526
C                                                        EXTRAD  1527
C            START RANGE FOR SEGMENT (CONTOUR)           EXTRAD  1528
C                                                        EXTRAD  1529
 121   IPCNT(K,IE)=IPCNT(K,IE)+1                         EXTRAD  1530
       IF(IPCNT(K,IE).LE.IMXJMX)GO TO 1211               EX1       79
       WRITE(6,1212)ITY,K,IE                             EX1       80
1212   FORMAT(2X,*NUMBER OF SEGMENTS EXCEEDS IMX*,3I10)  EX1       81
1211   IPE=IPCNT(K,IE)                                   EX1       82
       IREG=I-1                                          EXTR/   1532
       CALL IPK(IPC1,IREG,IPE,K,IE,IR,JR)                EXTRAD  1533
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      131  CONTINUE                                                      EXTRAD    1534
           GO TO 161                                                     EXTRAD    1535
      C                                                                  EXTRAD    1536
      C             END RANGE FOR SEGMENT                                EXTRAD    1537
      C                                                                  EXTRAD    1538
      141  DO 151 KL=K,IPT                                               EXTRAD    1539
           IF (U(I-1).EQ.-999) GO TO 161                                 EXTRAD    1540
           IF (IABS(U(I-1)).LE.TC(KL,IE)) GO TO 161                      EXTRAD    1541
           IPE=IPCNT(KL,IE)                                              EXTRAD    1542
           IREG=I-1                                                      EXTRAD    1543
           CALL IPK(IPC2,IREG,IPE,KL,IE,IR,JR)                           EXTRAD    1544
      151  CONTINUE                                                      EXTRAD    1545
      161  CONTINUE                                                      EXTRAD    1546
      C                                                                  EXTRAD    1547
      C             ASSOCIATE CELLS   LOOP ON THRESHOLD HIGHEST TO LOWEST EXTRAD   1548
      C                                                                  EXTRAD    1549
      940  DO 941 LC=1,IPT                                               EXTRAD    1550
           KC=IPT-LC+1                                                   EXTRAD    1551
           IF(KC.LE.0)GO TO 941                                          EXTRAD    1552
           NPC=IPCNT(KC,IE)                                              EXTRAD    1553
           IF(NPC.LE.0)GO TO 941                                         EXTRAD    1554
      C             LOOP ON SEGMENTS                                     EXTRAD    1555
           DO 931 IPE=1,NPC                                              EXTRAD    1556
           IHB=IUPK(IPC1,IPE,KC,IE,IR,JR)+1                              EX1         83
           IHBM=IHB-1                                                    TEST1      206
           IHD=IUPK(IPC2,IPE,KC,IE,IR,JR)                                EX1         84
           K=KC+1                                                        EXTRAD    1557
           NPK=0                                                         EXTRAD    1558
           TATM=0.                                                       EXTRAD    1559
           IF (K.GT.IPT) GO TO 193                                       EXTRAD    1560
           LPE=IPCNT(K,IE)                                               EXTRAD    1561
           IF(LPE.LE.0)GO TO 193                                         EXTRA[    1562
      192. DO 191 L=1,LPE                                                EXTRAD    1563
           IF(IUPK(IPC2,L,K,IE,IR,JR).LT.IHBM) GO TO 191                 TEST1      207
           IF(IUPK(IPC1,L,K,IE,IR,JR).GT.IHD) GO TO 193                  TEST1      208
           NPCEL= IUPK(IPC3,L,K,IE,IR,JR)                                EXTRAD    1568
           IF(NPCEL.EQ.0)GO TO 1911                                      EXTRAD    1569
           TATM=AMAX1(TATM,TATR(NPCEL,1))                                TEST       327
           IF(TATM.EQ.TATR(NPCEL,1))NPK=NPCEL                            TEST       328
      C                                                                  EXTRAD    1572
      C             NPCEL IS FOR NEXT HIGHER (ENCLOSED) THRESHOLD ON C RADIAL EXTRAD 1573
      C                                                                  EXTRAD    1574
      231  IF(ABS(TATR(NPCEL,1)).GT.(TC(KC,IE)+LDB))GO TO 932            TEST       329
      191  CONTINUE                                                      EXTRAD    1576
           GO TO 193                                                     EXTRAD    1577
      932  NPK=-NPCEL                                                    EXTRAD    1578
           GO TO 193                                                     EXTRAD    1579
      1911 NPK=-(NIDP+1)                                                 EX1         85
      C                                                                  EXTRAD    1581
      C             ASSOCIATE CELLS ON B RADIAL, TOP DOWN                EXTRAD    1582
      C                                                                  EXTRAD    1583
      193  MPK=0                                                         EXTRAD    1584
           IF(NA.EQ.1)GO TO 361                                          EXTRAD    1586
           TATM=0.                                                       EXTRAD    1587
           IF (JE2.EQ.0) GO TO 361                                       EXTRAD    1594
           DO 261 JE=JE1,JE2                                             EXTRAD    1595
           IF(IB(2,JE,1).LT.IHBM) GO TO 261                              TEST1      209
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          IF(IB(1,JE,1).GT.IHD) GO TO 361                                 TEST1     210
C                                                                         EXTRAD   1598
C               JE EVENT ON B RADIAL IS ASSOCIATED                        EXTRAD   1599
C                                                                         EXTRAD   1600
    271   IPB=IPTB(JE)                                                    EXTRAD   1601
          IF(IPB.LE.0)GO TO 261                                           EXTRAD   1602
          DO 291 LB=1,IPB                                                 EXTRAD   1603
          KB=IPB-LB+1                                                     EXTRAD   1604
          NP1=IPBNT(KB,JE)                                                EXTRAD   1605
          IF(NP1.LE.0)GO TO 291                                           EXTRAD   1606
          DO 281 JPE=1,NP1                                                EXTRAD   1607
          IF(IUPK(IPB2,JPE,KB,JE,IR,JR).LT.IHBM) GO TO 281                TEST1     211
          IF(IUPK(IPB1,JPE,KB,JE,IR,JR).GT.IHD) GO TO 281                 TEST1     212
          LPCEL=IUPK(IPB3,JPE,KB,JE,IR,JR)                                EXTRAD   1612
          IF(LPCEL.EQ.0)GO TO 281                                         EXTRAD   1614
          IF(TC(KC,IE) .LE. TB(KB,JE)) GO TO 282                          EXTRAD   1615
          IF(TB(KB,JE)+1.LT.TATR(LPCEL,1))GO TO 281                       TEST      330
    282   TATM=AMAX1(TATM,TATR(LPCEL,1))                                  TEST1     213
          IF(TATM.NE.TATR(LPCEL,1))GO TO 281                              TEST      332
          MPK=LPCEL                                                       EXTRAD   1619
          KBM=KB                                                          EXTRAD   1620
          JBM=JE                                                          EXTRAD   1621
    281   CONTINUE                                                        EXTRAD   1622
    291   CONTINUE                                                        EXTRAD   1623
    261   CONTINUE                                                        EXTRAD   1624
          IF(MPK.NE.0)GO TO 3661                                          EX1        86
          DO 194 I=IHB,IHD                                                EX1        87
          IF(HB(I).EQ.-999)GO TO 194                                      EX1        88
          IF(IABS(HB(I)).GT.TC(KC,I)+LDB)GO TO 934                        EX1        89
    194   CONTINUE                                                        EX1        90
          GO TO 361                                                       EX1        91
   3661   IF(ABS(TATR(MPK,1)).GT.TC(KC,IE)+LDB)MPK=-MPK                   TEST      333
          GO TO 361                                                       EXTRAD   1627
    934   MPK=-(NIDP+1)                                                   EX1        93
C                                                                         EXTRAD   1629
C               HAVE B COMPARE WITHIN RANGE                               EXTRAD   1630
C                                                                         EXTRAD   1631
    361   CONTINUE                                                        EXTRAD   1632
          IF(MPK.EQ.0.AND.NPK.EQ.0)GO TO 631                              EXTRAD   1633
C                                                                         EXTRAD   1634
C               MPK=0.AND.NPK=0 - NO COMPARE                              EXTRAD   1635
C               MPK=0.AND.NPK.NE.0 - NO B COMPARE                         EXTRAD   1636
C               NPK=0.AND.MPK.NE.0 - B COMPARE                            EXTRAD   1637
C               HIGHEST THIS RADIAL                                       EXTRAD   1638
C                                                                         EXTRAD   1639
          IF(MPK.EQ.0.AND.NPK.LT.0)GO TO 931                              EXTRAD   1640
          IF(MPK.NE.0)GO TO 421                                           EXTRAD   1641
C                                                                         EXTRAD   1642
C               NO PRIOR RADIA. FOR COMPARISON, INCREMENT NPCEL           EXTRAD   1643
C                                                                         EXTRAD   1644
    381   NPCEL=NPK                                                       EXTRAD   1645
          IF(NA .EQ. 1 .AND. ISCANF .EQ. 1) GO TO 392                     EXTRAD   1646
          IF(NA.EQ.1)GO TO 353                                            EXTRAD   1647
          DO 352 I=IHB,IHD                                                EXTRAD   1648
          IF(HB(I).EQ.-999)GO TO 352                                      EXTRAD   1649
          IF(HB(I) .GT. TC(KC,IE))GOTO 931                                EXTRAD   1650
    352   CONTINUE                                                        EXTRAD   1651
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  359   INDX=TATR(NPCEL,1)-TC(K3,IE)-1                              TEST      334
  391   IF(INDX.GE.LDB.OR.INDX.LE.0)GOTO 366                        EXTRAD   1653
  392   IN=1+INDX*LM                                                TEST      335
        INX=IDX+INDX*LM                                             EXTRAD   1657
        IF(TATR(NPCEL,IN).NE.0..OR.NA.EQ.1)GO TO 3921               TEST      336
        IF(TATR(NPCEL,IN-LMM).LE.0.)GO TO 931                       TEST      337
        MPC=NPCEL                                                   TEST      338
        NPCEL=TATR(NPCEL,IN-LMM)                                    TEST      339
        IF(MPC.EQ.NPCEL)GO TO 931                                   TEST      340
        GO TO359                                                    EXTRAD   1662
 3921   CALL IPK(IPC3,NPCEL,IPE,K3,IE,IR,JR)                        TEST      341
        IST=IHB                                                     TEST1     214
        ISP=IHD                                                     TEST1     215
        DO 411 I=IST,ISP                                            EXTRAD   1665
        R=SCONC*(FLOAT(I-1)-.5)                                     EXTRAD   1666
        RU=R*ABS(FLOAT(U(I)))                                       TEST      344
        TATR(NPCEL,IN+1)=TATR(NPCEL,IN+1)+DAZ*R                     TEST      345
        TATR(NPCEL,IN+2)=TATR(NPCEL,IN+2)+DAZ*RJ                    TEST      346
        TATR(NPCEL,IN+3)=TATR(NPCEL,IN+3)+DAZ*SAZ*R*RJ              TEST      347
        TATR(NPCEL,IN+4)=TATR(NPCEL,IN+4)+DAZ*CAZ*R*RJ              TEST      348
        IF(ITY.EQ.0)GO TO 411                                       EX2       154
        IF(SV(I).NE.-999)                                           TEST      349
       *TATR(NPCEL,IN+5)=TATR(NPCEL,IN+5)+DAZ*R*SV(I)               TEST      350
        IF(ITY.GE.2)GO TO 401                                       TEST      351
        IF(V(I).EQ.-999)GO TO411                                    EXTRAD   1672
        TATR(NPCEL,IN+8)=TATR(NPCEL,IN+8)+DAZ*R*V(I)                TEST1     216
        IF(V(I-1).EQ.-999)GO TO 401                                 EXTRAD   1674
        TATR(NPCEL,IN+7)=TATR(NPCEL,IN+7)+DAZ*R*(V(I)-V(I-1))       TEST      352
  401   IF (VS(I).EQ.-999) GO TO 411                                EXTRAD   1676
        TATR(NPCEL,IN+6)=TATR(NPCEL,IN+6)+R*VS(I)*DAZ               TEST      353
  411   CONTINUE                                                    EXTRAD   1678
  419   TATR(NPCEL,INX)=SIGN(FLOAT(NA),TATR(NPCEL,INX))             TEST      354
        IF(NA.EQ.1)TATR(NPCEL,INX)=SIGN(TATR(NPCEL,INX),-1.0)       TEST      355
        IF(IST.LE.IMN.OR.ISP.GE.IMX) TATR(NPCEL,LDX)=-999.          TEST2     154
        IF(IST.LE.IMN.OR.ISP.GE.IMX) TATR(NPCEL,LDX)=-999.          TEST2     155
        GO TO 366                                                   EXTRAD   1682
 3662   NPCEL=-NPK                                                  EXTRAD   1683
        IF(NPCEL.GT.NIDP.OR.NPCEL.LE.0)GO TO 931                    EX1        94
  366   INDX=TATR(NPCEL,1)-TC(K3,IE)-1                              TEST      357
C                                                                   EXTRAD   1686
C                COMBINE LPCEL WITH NPCEL AT THIS LEVEL             EXTRAD   1687
C          COMBINE BY SETTING AREA AS POINTER AND IDX TO NA = 0     EXTRAD   1688
C                                                                   EXTRAD   1689
        DO 365 L=1,LPE                                              EXTRAD   1690
        IF(IUPK(IPC2,L,K,IE,IR,JR).LT.IHBM) GO TO 365               TEST1     217
        IF(IUPK(IPC1,L,K,IE,IR,JR).GT.IHD) GO TO 931                TEST1     218
        LPCEL=IUPK(IPC3,L,K,IE,IR,JR)                               EXTRAD   1695
  341   IF(LPCEL.EQ.0)GO TO 365                                     EXTRAD   1696
        IF(TATR(LPCEL,IDX).EQ.0.)GO TO 365                          TEST      358
  351   IF(NPCEL.EQ.LPCEL)GO TO 365                                 EXTRAD   1698
        INDX=TATR(LPCEL,1)-TC(K3,IE)-1                              TEST      359
        IF(INDX.GE.LDB)GO TO 365                                    EXTRAD   1700
        IF(INDX.LE.0)INDX=0                                         EXTRAD   1701
        IND=IDX+INDX*LM                                             EXTRAD   1702
        IF(TATR(LPCEL,IND).EQ.0.)GO TO 365                          TEST      360
        IND=INDX+1                                                  EXTRAD   1704
        IPG=0                                                       EXTRAD   1705
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            DO 3663 J=IND,LDB                                            EXTRAD   1706
            IN=(J-1)*LM+1                                                EXTRAD   1707
            IF(TATR(LPCEL,IN+LM).EQ.N4)IPG=IPG+1                         TEST      361
            DO 3663 I=1,LM                                               EXTRAD   1709
      3663  TATR(LPCEL,I+IN)=0.                                          TEST      362
            IF(IPG.EQ.0.OR.IE.LE.1)GO TO 3664                            EXTRAD   1711
            IET=IE-1                                                     EXTRAD   1712
            DO 3665 I=1,IET                                              EXTRAD   1713
            IPTT=IPTC(I)                                                 EXTRAD   1714
            IF(IPTT.LE.0)GO TO 3665                                      EXTRAD   1715
            DO 3666 KT=1,IPTT                                            EXTRAD   1716
            NPCT=IPCNT(KT,I)                                             EXTRAD   1717
            IF(NPCT.LE.0)GO TO 3666                                      EXTRAD   1718
            DO 3667 LP=1,NPCT                                            TEST1     219
            IF(LPCEL.NE.IUFK(IPC3,LP,KT,I,IR,JR)) GO TO 3667             TEST1     220
            INDXT=TATR(NPCEL,1)-TC(KT,I)-1                               TEST      363
            IF(INDXT.LT.LDB)GO TO 3668                                   EXTRAD   1722
      3669  CALL IPK(IPC3,IZERO,LP,KT,I,IR,JR)                           TEST1     221
            GO TO 3667                                                   EXTRAD   1724
      3668  IF(IMDX.GE.LDB)GO TO 3669                                    EXTRAD   1725
            CALL IPK(IPC3,NPCEL,LP,KT,I,IR,JR)                           TEST1     222
      3667  CONTINUE                                                     EXTRAD   1727
      3666  CONTINUE                                                     EXTRAD   1728
      3665  CONTINUE                                                     EXTRAD   1729
            IPG=0                                                        EXTRAD   1730
      3664  IF(IMDX.GE.LDB)GO TO 365                                     EX1        95
            IACT(LPCEL)=-NPCEL                                           EXTRAD   1732
            TATR(LPCEL,2+INDX*LM)=NPCEL                                  TEST      364
            IF(INDX.NE.0)GO TO 365                                       EXTRAD   1734
            IACT(LPCEL)=-NIOP-1                                          EX1        96
            TATR(LPCEL,2)=0.                                             TEST      365
       365  CONTINUE                                                     EXTRAD   1737
            GO TO 931                                                    EXTRAD   1738
      C                                                                  EXTRAD   1739
      C               COMBINE NPCEL AND LPCEL, PEAK VALUES EQUAL         EXTRAD   1740
      C                                                                  EXTRAD   1741
      C                                                                  EXTRAD   1742
      C                COMBINE WITH 8 RADIAL CELLS                       EXTRAD   1743
      C                                                                  EXTRAD   1744
       421  IF(MPK.LE.0)GOTO 422                                         EX1        97
            IF(NPK.LT.0)GO TO 3662                                       EXTRAD   1746
            NGM=0                                                        EXTRAD   1747
            LPCEL=MPK                                                    EXTRAD   1748
            IF(TATR(LPCEL,IDX).EQ.N4.AND.NPK.EQ.0.AND.TC(KC,IE).GT.TB(KBM,JBM) TEST  366
           *)GO TO 485                                                   EXTRAD   1750
            INDX=TATR(LPCEL,1)-TC(KC,IE)-1                               TEST      367
            IMDX=INDX                                                    EXTRAD   1752
            IF(NPK.GT.0)IMDX=TATR(NPK,1)-TC(KC,IE)-1                     TEST      368
            IF(IMDX.LE.INDX)GO TO 4212                                   EXTRAD   1754
            NGM=1                                                        EXTRAD   1755
            NPCEL=NPK                                                    EXTRAD   1756
            IND=INDX                                                     EXTRAD   1757
            INDX=IMDX                                                    EXTRAD   1758
            IMDX=IND                                                     EXTRAD   1759
            GO TO 4213                                                   EXTRAD   1760
      4212  IF(INDX.LT.0)GO TO 481                                       EXTRAD   1761
            NPCEL=LPCEL                                                  EXTRAD   1762
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      C                                                                   EXTRAD    1763
      C          COMBINE WITH B - RADIAL, C-LEVEL LOWER                   EXTRAD    1764
      C                                                                   EXTRAD    1765
 4213 IF(INDX.GE.LDB)GO TO 4221                                           EXTRAD    1766
      IN=INDX*LM                                                          EXTRAD    1768
  512 IF(TATR(NPCEL,IN+IDX).NE.0.)GO TO 5311                              TEST       369
      IF(TATR(NPCEL,2+IN).LE.0..AND.NGM.EQ.0)GO TO 4221                   TEST       370
      IF(NGM.NE.1)GO TO 5312                                              EXTRAD    1771
 5314 IM=IMDX*LM                                                          EXTRAD    1772
      IF(IM.LT.0) GO TO 5311                                              TEST1      223
      IF(LPCEL.LE.0.OR.LPCEL.GT.NMX) GO TO 931                            TEST1      224
      IF(TATR(LPCEL,IM+IDX).NE.0.)GO TO 5311                              TEST       371
      IF(TATR(LPCEL,2+IM).GT.0.)GO TO 5313                                TEST       372
      LPCEL=NPCEL                                                         EXTRAD    1775
      GO TO 4221                                                          EXTRAD    1776
 5313 LPCEL=TATR(LPCEL,2+IM)                                              TEST       373
      IF(LPCEL.EQ.NPCEL.OR.LPCEL.GT.NMX)GO TO 4221                        EXTRAD    1778
      IMDX=TATR(LPCEL,1)-TC(KC,IE)-1                                      TEST       374
      GO TO 5314                                                          EXTRAD    1780
 5312 NPCEL=TATR(NPCEL,2+IN)                                              TEST       375
      IF(NPCEL.LE.0.OR.NPCEL.GT.NMX)GO TO 4221                            EX1         99
      INDX=TATR(NPCEL,1)-TC(KC,IE)-1                                      TEST       376
      GO TO 4213                                                          EXTRAD    1783
 5311 CALL IFK(IFC3,NPCEL,IPE,KC,IE,IR,JR)                                TEST       377
      IST=IHB                                                             TEST1      225
      ISP=IHD                                                             TEST1      226
      DO 531 I=IST,ISP                                                    EXTRAD    1786
      R=SCONC*(FLOAT(I-1)-.5)                                             EXTRAD    1787
      RU=R*ABS(FLOAT(U(I)))                                               TEST       379
      TATR(NPCEL,2+IN)=TATR(NPCEL,2+IN)+DAZ*R                             TEST       380
      TATR(NPCEL,3+IN)=TATR(NPCEL,3+IN)+DAZ*RU                            TEST       381
      TATR(NPCEL,4+IN)=TATR(NPCEL,4+IN)+DAZ*SAZ*R*RU                      TEST       382
      TATR(NPCEL,5+IN)=TATR(NPCEL,5+IN)+DAZ*CAZ*R*RU                      TEST       383
      IF(ITY.EQ.0)GO TO 531                                               EX2        161
      IF(SV(I).NE.-999)                                                   TEST       384
     +TATR(NPCEL,6+IN)=TATR(NPCEL,6+IN)+DAZ*R*SV(I)                       TEST       385
      IF(ITY.GE.2)GO TO 521                                               TEST       366
      IF(V(I) .EQ. -999)GO TO 531                                         EXTRAD    1794
      TATR(NPCEL,9+IN)=TATR(NPCEL,9+IN)+DAZ*R*V(I)                        TEST       387
      IF(V(I-1) .EQ. -999)GO TO 521                                       EXTRAD    1796
      TATR(NPCEL,8+IN)=TATR(NPCEL,8+IN)+DAZ*R*(V(I)-V(I-1))               TEST       388
  521 IF (VS(I).EQ.-999) GO TO 531                                        EXTRAD    1798
      TATR(NPCEL,7+IN)=TATR(NPCEL,7+IN)+DAZ*R*VS(I)                       TEST       389
  531 CONTINUE                                                            EXTRAD    1800
      TATR(NPCEL,IN+IDX)=SIGN(FLOAT(NA),TATR(NPCEL,IN+IDX))               TEST       390
      IF(NA.EQ.1)TATR(NPCEL,IN+IDX)=SIGN(TATR(NPCEL,IN+IDX),-1.0)         TEST       391
      LPCEL=NPCEL                                                         EXTRAD    1804
      GO TO 4221                                                          EXTRAD    1805
      C                                                                   EXTRAD    1806
      C          COMBINE WITH B-RADIAL, C-LEVEL HIGHER                    EXTRAD    1807
      C                                                                   EXTRAD    1808
      C          IF FIRST COMBINE, AREA=0, IF SECOND OR HIGHER, AREA=-1.  EXTRAD    1809
      C          TEST AREA TO ESTABLISH NEW NUMBERS                       EXTRAD    1810
      C                                                                   EXTRAD    1811
  481 INDX=-INDX                                                          EXTRAD    1812
      IND=NUMP-1                                                          EXTRAD    1813
      INDP=LOB                                                            EXTRAD    1814
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AD-A057 153 ENVIRONMENTAL RESEARCH AND TECHNOLOGY INC CONCORD MASS F/G 4/2
DEVELOPMENT OF TECHNIQUES FOR SHORT-RANGE PRECIPITATION FORECAS--ETC(U)
DEC 77 R K CRANE F19628-77-C-0058
UNCLASSIFIED AFGL-TR-78-0005 NL

2 OF 2
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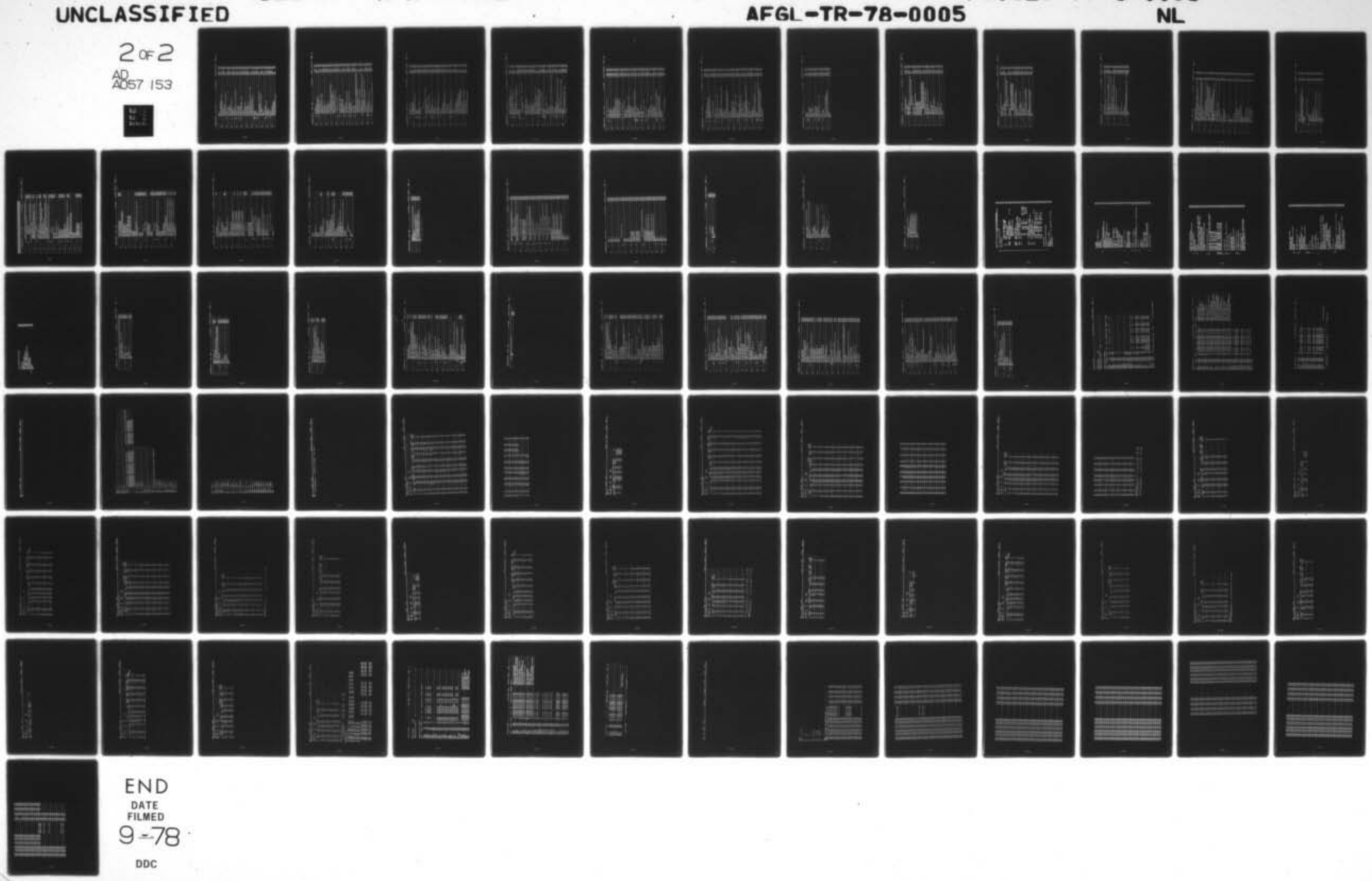

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            INS=2                                                EXTRAD  1815
            IPG=0                                                EXTRAD  1816
            TATR(LPCEL,1)=TC(KC,IE)+1                            TEST     393
            TATR(LPCEL,NUMP)=ABS(ATR(IAT,IID1,1))                TEST1    227
            IF(INDX.GE.LDB)GO TO 482                             EXTRAD  1819
            IND=LDB-INDX                                         EXTRAD  1820
            DO 4832 I=INDX,LDBM                                  EXTRAD  1821
            IF(TATR(LPCEL,IDX+I*LM).EQ.NA)IPG=IPG+1              TEST     395
      4832  CONTINUE                                             EX1      100
            DO 483 I=1,IND                                       EXTRAD  1824
            DO 483 J=1,LM                                        EXTRAD  1825
            IN=1+J+(LDB-I)*LM                                    EXTRAD  1826
            IM=1+J+(IND-I)*LM                                    EXTRAD  1827
       483  TATR(LPCEL,IN)=TATR(LPCEL,IM)                        TEST     396
            IND=INDX*LM+1                                        EXTRAD  1829
            INDP=INDX                                            EXTRAD  1830
       482  DO 4835 I=1,LDB                                      EXTRAD  1831
            IF(TATR(LPCEL,IDX+(I-1)*LM).EQ.NA)IPG=IPG+1          TEST     397
      4835  CONTINUE                                             EXTRAD  1833
            DO 484 I=INS,IND                                     EXTRAD  1834
       484  TATR(LPCEL,I)=0.                                     TEST     398
            DO 4841 I=1,INDP                                     EXTRAD  1836
      4841  TATR(LPCEL,I*LM+1)=NA                                TEST     399
            IF(IPG.EQ.0.OR.IE.LE.1)GO TO 488                     EXTRAD  1838
            IET=IE-1                                             EXTRAD  1839
            IPTT=IPTC(I)                                         EXTRAD  1840
            IF(IPTT.LE.0)GO TO 4831                              EXTRAD  1841
            DO 4833 KT=1,IPTT                                    EXTRAD  1842
            NPCT=IPCNT(KT,I)                                     EXTRAD  1843
            IF(NPCT.LE.0)GO TO 4833                              EXTRAD  1844
            DO 4834 LP=1,NPCT                                    TEST1    228
            IF(LPCEL.NE.IUFK(IPC3,LP,KT,I,IR,JR)) GO TO 4834     TEST1    229
            INDXT=TATR(LPCEL,1)-TC(KT,I)-1                       TEST     400
            IF(INDXT.LT.LDB)GO TO 4834                           EXTRAD  1846
            CALL IPK(IPC3,IZERO,LP,KT,I,IR,JR)                   TEST1    230
      4834  CONTINUE                                             EXTRAD  1850
      4833  CONTINUE                                             EXTRAD  1851
      4831  CONTINUE                                             EXTRAD  1852
            IPG=0                                                EXTRAD  1853
       488  IN=0                                                 EXTRAD  1854
            IF(LPCEL.LE.0.OR.LPCEL.GT.NMX)GO TO 931              EX1      101
            TATR(LPCEL,IDX)=NA                                   TEST     401
            CALL IPK(IPC3,LPCEL,IPE,KC,IE,IR,JR)                 EXTRAD  1856
            NPCEL=LPCEL                                          EXTRAD  1857
            NGH=0                                                EX1      102
            GO TO 512                                            EXTRAD  1858
       485  DO 486 I=1,NIOP                                      EX1      103
            IF(IACT(I).EQ.0)GO TO 487                            EXTRAD  1860
       486  CONTINUE                                             EXTRAD  1861
            WRITE(6,644)                                         EXTRAD  1862
            GO TO 931                                            EXTRAD  1863
       487  LPCEL=I                                              EXTRAD  1864
            IACT(I)=1                                            EXTRAD  1865
            NMX=MAX0(NMX,I+1)                                    EXTRAD  1866
            IF(NMX.GT.NIOP)NMX=NIOP                              EX1      104
            TATR(LPCEL,1)=TC(KC,IE)+1                            TEST     402
            TATR(LPCEL,NUMP)=ABS(ATR(IAT,IID1,1))                TEST1    231
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            GO TO 400                                                   EXTRAD  1870
        422 LPCEL=IABS(MPK)                                             EXTRAD  1871
            IF(LPCEL.GT.NILP)GO TO 931                                  EX1      105
       4221 INDX=TATR(LPCEL,1)-TC(KC,IE)-1                              TEST     404
            IF(INDX.LT.0)GO TO 931                                      EX1      106
            DO 441 JE=JE1,JE2                                           EXTRAD  1874
            IF(IB(2,JE,1).LT.IHBM) GO TO 441                            TEST1    232
            IF(IB(1,JE,1).GT.IHD) GO TO 632                             TEST1    233
            IPB=IPTB(JE)                                                EXTRAD  1877
            IF(IPB.LE.0)GO TO 441                                       EXTRAD  1878
            DO 471 LB=1,IPB                                             EXTRAD  1879
            KB=IPB-LB+1                                                 EXTRAD  1880
            MPB=IPBNT(KB,JE)                                            EXTRAD  1881
            IF(MPB.LE.0)GO TO 471                                       EXTRAD  1882
            DO 461 JPE=1,MPB                                            EXTRAD  1883
            IF(IUPK(IPE2,JPE,KB,JE,IR,JR).LT.IHBM) GO TO 461            TEST1    234
            IF(IUPK(IPB1,JPE,KB,JE,IR,JR).GT.IHD) GO TO 632             TEST1    235
            NPCEL=IUPK(IPB3,JPE,KB,JE,IR,JR)                            EXTRAD  1888
            IF(NPCEL.LE.0.OR.NPCEL.GT.NNX)GO TO 461                     EX1      107
            IF(LPCEL.EQ.NPCEL)GO TO 461                                 EXTRAD  1890
            IF(YB(KB,JE) .NE. YC(KC,IE))GO TO 461                       EXTRAD  1891
C                                                                       EXTRAD  1892
C           COMBINE AT YB=YC LEVEL                                      EXTRAD  1893
C                                                                       EXTRAD  1894
        502 INDX=TATR(NPCEL,1)-TC(KC,IE)-1                              TEST     405
            IF(INDX.GE.LDB)GO TO 461                                    EXTRAD  1896
            IF(INDX.LE.0)GO TO 8511                                     EX1      108
            IF(INDX.LT.LDB)GO TO 861                                    EX1      109
        851 ND=1+INDX*LM                                                EXTRAD  1899
            DO 852 I=1,LM                                               EXTRAD  1900
        852 TATR(NPCEL,ND+I)=0.                                         TEST     406
            CALL IPK(IPB3,IZERO,JPE,KB,JE,IR,JR)                        EXTRAD  1902
            GO TO 461                                                   EXTRAD  1903
       8511 CALL IPK(IPB3,IZERO,JPE,KB,JE,IR,JR)                        EXTRAD  1904
            DO 8512 J=2,NOMP                                            EXTRAD  1905
       8512 TATR(NPCEL,J)=0.                                            TEST     407
            IACT(NPCEL)=-(NIDP+1)                                       EX1      110
            GO TO 461                                                   EXTRAD  1908
        861 LD=1+INDX*LM                                                EXTRAD  1909
            ND=1+INDX*LM                                                EXTRAD  1910
            IF(TATR(LPCEL,LD+LM).NE.0..AND.TATR(NPCEL,ND+LM).NE.0.)GO TO 8911 TEST 408
            IF(TATR(LPCEL,LD+LM).EQ.0. .AND.TATR(LPCEL,LD+1).LE.0.)GO TO 851 TEST 409
            IF(TATR(LPCEL,LD+LM).GT.0.)GO TO 8912                       TEST     410
            LPCEL=TATR(LPCEL,LD+1)                                      TEST     411
            IF(LPCEL.LE.0.OR.LPCEL.GT.NNX)GO TO 931                     EX1      111
            GO TO 4221                                                  EXTRAD  1915
       8912 IF(TATR(NPCEL,ND+LM).EQ.0..AND.TATR(NPCEL,ND+1).LE.0.)GO TO 8913 TEST 412
            NPCEL=TATR(NPCEL,ND+1)                                      TEST1    236
            IF(NPCEL.LE.0.OR.NPCEL.GT.NNX.OR.NPCEL.EQ.LPCEL)GO TO 461   EX1      112
            CALL IPK(IPB3,NPCEL,JPE,KB,JE,IR,JR)                        EXTRAD  1918
            GO TO 502                                                   EXTRAD  1919
       8913 DO 8914 I=1,LM                                              EXTRAD  1920
       8914 TATR(LPCEL,LD+I)=0.                                         TEST     414
            CALL IPK(IPB3,IZERO,JPE,KB,JE,IR,JR)                        EXTRAD  1922
            GO TO 4221                                                  EXTRAD  1923
       8911 DO 891 I=1,LMM                                              EXTRAD  1924
            TATR(LPCEL,LD+I)=TATR(NPCEL,ND+I)+TATR(LPCEL,LD+I)          TEST1    237
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                TATR(NPCEL,ND+I)=0.                                      TEST      416
        891     CONTINUE                                                 EXTRAD   1927
                TATR(NPCEL,ND+LM)=0.                                     TEST      417
                TATP(NPCEL,ND+1)=LPCEL                                   TEST      418
                IACT(NPCEL)=-LPCEL                                       EXTRAD   1930
                CALL IPK(IPB3,LPCEL,JPE,<3,JE,IR,JR)                     EXTRAD   1931
        461     CONTINUE                                                 EXTRAD   1932
        471     CONTINUE                                                 EXTRAD   1933
        441     CONTINUE                                                 EXTRAD   1934
        632     IF(NPK.LE.0)GO TO 3662                                   EXTRAD   1935
                NPCEL=LPCEL                                              EXTRAD   1936
                GO TO 366                                                EXTRAD   1937
        C                                                                EXTRAD   1938
        C                 UNASSOCIATED                                   EXTRAD   1939
        C                                                                EXTRAD   1940
        631     IF(NA .EQ. 1 .AND. ISCANF .EQ. 0) GO TO 639              EXTRAD   1941
                IF (NA .EQ. 1) GO TO 630                                 EXTRAD   1942
                DO 641 I=IHB,IHD                                         EXTRAD   1943
                IF (HB(I).EQ.-999) GO TO 641                             EXTRAD   1944
                IF(HB(I) .GT. TC(KC,IE))GOTO 931                         EXTRAD   1945
        641     CONTINUE                                                 EXTRAD   1946
        639     DO 642 J=1,NIDP                                          EX1       113
                IF(IACT(J).EQ.0)GO TO 643                                EXTRAD   1948
        642     CONTINUE                                                 EXTRAD   1949
                WRITE(6,644)                                             EXTRAD   1950
        644     FORMAT(5X,* TOO MANY CE__S*)                             EXTRAD   1951
                GO TO 931                                                EXTRAD   1952
        630     NCELT=NCELT+1                                            EXTRAD   1953
                CALL IPK(IPC3,NCELT,IPE,<3,IE,IR,JR)                     EXTRAD   1954
                GO TO 931                                                EXTRAD   1955
        643     NPCEL=J                                                  EXTRAD   1956
                IACT(J)=1                                                EXTRAD   1957
                NMX=MAX0(NMX,J+1)                                        EXTRAD   1958
                IF(NMX .GT. NIDP)NMX=NIDP                                EX1       114
                CALL IPK(IPC3,NPCEL,IPE,<3,IE,IR,JR)                     EXTRAD   1960
                IN1=LM+1                                                 EXTRAD   1961
                IN=(LDB-1)*LM+IN1                                        EXTRAD   1962
                DO 671 I=IN1,IN                                          EXTRAD   1963
                TATR(NPCEL,I)=0.0                                        TEST      419
        671     CONTINUE                                                 EXTRAD   1965
        591     TATR(NPCEL,1)=TC(KC,IE)+1                                TEST      420
                TATR(NPCEL,NUMP)=ABS(ATR(IAT,IID1,1))                    TEST1     238
                IST=IHE                                                  TEST1     239
                ISP=IHC                                                  TEST1     240
                DO 621 I=IST,ISP                                         EXTRAD   1971
                R=SCONC*(FLOAT(I-1)-.5)                                  EXTRAD   1972
                RU=R*ABS(FLOAT(U(I)))                                    TEST      422
                TATR(NPCEL,2)=DAZ*R+TATR(NPCEL,2)                        TEST      423
                TATR(NPCEL,3)=DAZ*RU+TATR(NPCEL,3)                       TEST      424
                TATR(NPCEL,4)=DAZ*SAZ*R*RJ+TATR(NPCEL,4)                 TEST      425
                TATR(NPCEL,5)=TATR(NPCE_,5)+DAZ*CAZ*R*RJ                 TEST1     241
                IF(ITY.EQ.0)GO TO 621                                    EX2       168
                IF(SV(I).NE.-999)                                        TEST      427
               +TATR(NPCEL,6)=TATR(NPCE_,6)+DAZ*R*SV(I)                  TEST      428
                IF(ITY.GE.2)GO TO 601                                    TEST      429
                IF(V(I).EQ.-999)GO TO 621                                EXTRAD   1978
                TATP(NPCEL,9)=TATR(NPCEL,9)+DAZ*R*V(I)                   TEST      430
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            IF(V(I-1) .EQ. -999)GO TO 601                                        EXTRAD  1980
            TATR(NPCEL,8)=TATR(NPCEL,8)+DAZ*R*(V(I)-V(I-1))                      TEST     431
      601   IF (VS(I).EQ.-999) GO TO 621                                         EXTRAD  1982
            TATR(NPCEL,7)=TATR(NPCEL,7)+DAZ*R*VS(I)                              TEST     432
      621   CONTINUE                                                             EXTRAD  1984
      939   TATR(NPCEL,IDX)=NA                                                   TEST     433
            IF(NA.EQ.1)TATR(NPCEL,IDX)=-TATR(NPCEL,IDX)                          TEST     434
            IF(IST.LE.IMN.OR.ISP.GE.IMX) TATR(NPCEL,LDX)=-999.                   TEST2    156
      931   CONTINUE                                                             EXTRAD  1988
      941   CONTINUE                                                             EXTRAD  1989
      951   CONTINUE                                                             EXTRAD  1990
      C                                                                          EXTRAD  1991
      C        CLEAN UP TATR AND IC ARRAYS  -  REMOVE IC POINTER                 EXTRAD  1992
      C        TO DELETED ARRAYS                                                 EXTRAD  1993
      C                                                                          EXTRAD  1994
            DO 9512 I=1,NMX                                                      EXTRAD  1995
            IF(IACT(I).EQ.0)GO TO 9512                                           EXTRAD  1996
            IF(IACT(I).GE.0)GO TO 9611                                           EXTRAD  1997
            DO 9613 IE=1,IEM                                                     EXTRAD  1998
            IPT=IPTC(IE)                                                         EXTRAD  1999
            IF(IPT.LE.0)GO TO 9613                                               EXTRAD  2000
            DO 9618 KC=1,IPT                                                     EXTRAD  2001
            NPC=IPCNT(KC,IE)                                                     EXTRAD  2002
            IF(NPC.LE.0)GO TO 9618                                               EXTRAD  2003
            DO 9619 IPE=1,NPC                                                    EXTRAD  2004
            IF(I.NE.IUPK(IPC3,IPE,KC,IE,IR,JR))GO TO 9619                        EXTRAD  2005
            IF(IACT(I).LT.-NIDP)GO TO 9514                                       EXI      115
            INDX=TATR(I,1)-TC(KC,IE)-1                                           TEST     436
            IF(TATR(I,IDX+INDX*LM).NE.0.)GO TO 9519                              TEST     437
            IF(TATR(I,2+INDX*LM).NE.-IACT(I))GO TO 9614                          TEST     438
            CALL IPK(IPC3,-IACT(I),IPE,KC,IE,IR,JR)                              EXTRAD  2010
            GO TO 9619                                                           EXTRAD  2011
      9614  CALL IPK(IPC3,IZERO,IPE,KC,IE,IR,JR)                                 EXTRAD  2012
      9619  CONTINUE                                                             EXTRAD  2013
      9618  CONTINUE                                                             EXTRAD  2014
      9613  CONTINUE                                                             EXTRAD  2015
            IF(IACT(I).GE.-NIDP)GO TO 9517                                       EXI      116
            IACT(I)=0                                                            EXTRAD  2017
            TATR(I,1)=0.                                                         TEST     439
            GO TO 9512                                                           EXTRAD  2019
      9517  DO 9513 J=1,LUB                                                      EXTRAD  2020
            IF(TATR(I,2+(J-1)*LM).EQ.-IACT(I).AND.TATR(I,IDX+(J-1)*LM).EQ.0.)    TEST     440
           +   GO TO 9514                                                        EXTRAD  2022
      9513  CONTINUE                                                             EXTRAD  2023
            GO TO 9611                                                           EXTRAD  2024
      9514  TATR(I,2+(J-1)*LM)=0.                                                TEST     441
      9611  DO 9612 K=2,LUB                                                      EXTRAD  2026
            IF(TATR(I,IDX+(K-1)*LM).NE.0..AND.TATR(I,2+(K-1)*LM).EQ.0.)          TEST     442
           +   TATR(I,IDX+(K-1)*LM)=0.                                           TEST     443
      9612  CONTINUE                                                             EXTRAD  2029
            IF(IFLAG.EQ.1)WRITE(6,998)I,IACT(I),(TATR(I,J),J=1,NUMP)             TEST     444
            IACT(I)=1                                                            EXTRAD  2031
      9512  CONTINUE                                                             EXTRAD  2032
            IF(NA.EQ.1.AND.ISCANF.EQ.0)GO TO 1030                                EXTRAD  2033
            IF (NA .EQ. 1 .AND. ISCANF .EQ. 1) GO TO 959                         EXTRAD  2034
            GO TO 952                                                            EXTRAD  2035
      C                                                                          EXTRAD  2036
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      C     COMBINE LAST TO FIRST CELL ATTR.                         EXTRAD  2037
      C                                                              EXTRAD  2038
      959   DO 9591 IE=1,IEM                                         EXTRAD  2039
            IPT=IPTC(IE)                                             EXTRAD  2040
            DO 9591 LC=1,IPT                                         EXTRAD  2041
            KC=IPT-LC+1                                              EXTRAD  2042
            NPC=IPCNT(KC,IE)                                         EXTRAD  2043
            DO 9591 IPE=1,NPC                                        EXTRAD  2044
            NPCEL=IUPK(IPC3,IPE,KC,IE,IR,JR)                         EXTRAD  2045
            IF(NPCEL .LE. 0) GO TO 9591                              EXTRAD  2046
            LPCEL=IUPK(IPB3,IPE,KC,IE,IR,JR)                         EXTRAD  2047
            IF(LPCEL .LE. 0) GO TO 9591                              EXTRAD  2048
            INDX=TATR(LPCEL,1)-TATR(NPCEL,1)                         TEST     445
            IF(INDX .LT. 0) GO TO 958                                EXTRAD  2050
      C                                                              EXTRAD  2051
      C   PEAK LPCEL .GE. PEAK NPCEL                                 EXTRAD  2052
      C                                                              EXTRAD  2053
            IF(INDX .GE. LDB) GO TO 955                              EXTRAD  2054
            IND=LDB-INDX                                             EXTRAD  2055
            DO 9592 I=1,IND                                          EXTRAD  2056
            IN=1+LMM(IND-I)*LM                                       EXTRAD  2057
            IF(TATR(NPCEL,IN).GE.0.)GO TO 9592                       TEST     446
            IN=1+LMM(LDB-I)*LM                                       EXTRAD  2059
            TATR(LPCEL,IN)=NAX-1                                     TEST     447
            DO 9593 J=1,LMM                                          EXTRAD  2061
            IN=1+J+(LDB-I)*LM                                        EXTRAD  2062
            IM=1+J+(IND-I)*LM                                        EXTRAD  2063
      9593  TATR(LPCEL,IN)=TATR(NPCEL,IM)+TATR(LPCEL,IN)             TEST     448
      9592  CONTINUE                                                 EXTRAD  2065
      9693    DO 9694 I=1,NUMP                                       EXTRAD  2066
      9694  TATR(NPCEL,I)=0.                                         TEST     449
            IACT(NPCEL)=0                                            EXTRAD  2068
            GO TO 9591                                               EXTRAD  2069
      955   TATR(LPCEL,LDX)=NAX-1                                    TEST     450
            GO TO 9591                                               EXTRAD  2071
      958   INDX=-INDX                                               EXTRAD  2072
            IF(INDX .GE. LDB) GO TO 9591                             EXTRAD  2073
      C                                                              EXTRAD  2074
      C PEAK NPCEL .GT. LPCEL                                        EXTRAD  2075
      C                                                              EXTRAD  2076
            IND=LDB-INDX                                             EXTRAD  2077
            DO 9691 I=1,IND                                          EXTRAD  2078
            IN=1+LMM(LDB-I)*LM                                       EXTRAD  2079
            IF(TATR(NPCEL,IN).GE.0.)GO TO 9691                       TEST     451
            TATR(NPCEL,IN)=NAX-1                                     TEST     452
            DO 9692 J=1,LMM                                          EXTRAD  2082
            IN=1+J+(LDB-I)*LM                                        EXTRAD  2083
            IM=1+J+(IND-I)*LM                                        EXTRAD  2084
      9692  TATR(NPCEL,IN)=TATR(LPCEL,IM)+TATR(NPCEL,IN)             TEST     453
      9691  CONTINUE                                                 EXTRAD  2086
            CALL IPK(IPB3,NPCEL,IPE,KC,IE,IR,JR)                     EXTRAD  2087
            TATR(NPCEL,NUMP)=TATR(LPCEL,NUMP)                        TEST     454
            NPCEL=LPCEL                                              EXTRAD  2089
            GO TO 9693                                               EXTRAD  2090
      9591  CONTINUE                                                 EXTRAD  2091
      C                                                              EXTRAD  2092
      C              END OF ASSOCIATION LOOPS                        EXTRAD  2093
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      C                                                                          EXTRAD  2094
      952  DO 991 I=1,NMX                                                        EXTRAD  2095
           IF(IACT(I).EQ.0)GO TO 991                                             EXTRAD  2096
           IF(TATR(I,LDX).EQ.-999.)GO TO 9982                                    TEST     455
      961  IF(TATR(I,LDX).EQ.0.)GO TO 9912                                       TEST     456
           IF(ABS(TATR(I,LDX)).EQ.MAX-1)GO TO 971                                TEST     457
           GO TO 991                                                             EXTRAD  2100
      C                                                                          EXTRAD  2101
      C     CHECK BACKROUND COMING DOWN                                          EXTRAD  2102
      C                                                                          EXTRAD  2103
      971  INBR=0                                                                EXTRAD  2104
           DO 9716 J=1,LDBM                                                      EXTRAD  2105
           IF(TATR(I,I+(J-1)*LM).LE.0.)GO TO 9982                                TEST     458
     9716  CONTINUE                                                              EXTRAD  2107
           DO 9711 J=1,JEM                                                       EXTRAD  2108
           IID1=IB(NPA,J,1)                                                      EXTRAD  2109
           IF(TATR(I,NUMP).NE.ABS(TTR(IAT,IID1,1))) GO TO 9711                   TEST1    242
     9712  IPB=IPTB(J)                                                           EXTRAD  2111
           DO 9713 K=1,IPB                                                       EXTRAD  2112
           NP=IPBNT(K,J)                                                         EXTRAD  2113
           DO 9713 N=1,NP                                                        EXTRAD  2114
           IF(I .NE. IUPK(IPB3,N,K,J,IR,JR)) GO TO 9713                          EXTRAD  2115
           IF((TATR(I,I)-TB(K,J)).EQ.LDB)GO TO 9714                              TEST     460
     9713  CONTINUE                                                              EXTRAD  2117
           GO TO 9711                                                            EXTRAD  2118
     9714  INBR=INBR+1                                                           EXTRAD  2119
           IST=IUPK(IPB1,N,K,J,IR,JR)                                            EXTRAD  2120
           ISP=IUPK(IPB2,N,K,J,IR,JR)+1                                          EXTRAD  2121
           DO 9715 L=IST,ISP                                                     EXTRAD  2122
           IF(U(L).EQ.-999)GO TO 9715                                            EX1      117
           IF(ABS(U(L)) .GT. TB(K,J)) GO TO 9982                                 EXTRAD  2123
     9715  CONTINUE                                                              EXTRAD  2124
     9711  CONTINUE                                                              EXTRAD  2125
           IF(INBR.EQ.0)GO TO 9982                                               EXTRAD  2126
           IF(TATR(I,LDX).LT.0.)GO TO 991                                        TEST     461
           IF(TATR(I,ID2+1).LE.TATRMN)GO TO 9982                                 TEST     462
           DO 981 J=1,LMM                                                        EXTRAD  2129
           UP(NCELL,J)=TATR(I,ID2+J)                                             TEST1    243
      981  CONTINUE                                                              EXTRAD  2131
           UP(NCELL,LM)=TATR(I,NUMP)                                             TEST1    244
           IF(IFLAG.EQ.1)WRITE(6,9910)NCELL,(UP(NCELL,J),J=1,LM)                 TEST1    245
     9910  FORMAT(1X,2HCC,I4,4X,9F13.2)                                          EX2      175
           NCELL=NCELL+1                                                         EXTRAD  2135
           IF(NCELL.LE. NID)GO TO9982                                            EXTRAD  2136
           NCELL=NID                                                             EXTRAD  2137
           GO TO 9982                                                            EXTRAD  2138
     9912  DO 9913 J=1,LDE                                                       EXTRAD  2139
           INDP1=1+J*LM                                                          EXTRAD  2140
           IF(ABS(TATR(I,INDP1)).EQ.NA)GO TO 991                                 TEST     465
           IF(TATR(I,INDP1).LT.0..AND.TATR(I,INDP1).NE.-999.)GO TO 991           TEST     466
     9913  CONTINUE                                                              EXTRAD  2143
     9982  CONTINUE                                                              EXTRAD  2144
           IF(IFLAG.EQ.1)WRITE(6,999)I,IACT(I),( TATR(I,J),J=1,NUMP)             TEST     467
      999  FORMAT(1X,2HXX,I4,I6,F7.2,8F13.2,/,(20X,8F13.2))                      EXTRAD  2146
      998  FORMAT(3X,I4,I6,F7.2,8F13.2,/,(20X,8F13.2))                           EXTRAD  2147
           DO 982 J=1,NUMP                                                       EXTRAD  2148
      982  TATR(I,J)=0.                                                          TEST     468
```

```
            IACT(I)=5                                          EXTRAD   2150
      991   CONTINUE                                           EXTRAD   2151
     1030   CONTINUE                                           TEST      465
     1031   DO 1041 I=1,IEMAX                                  EXTRAD   2160
            IPYB(I)=IPYC(I)                                    EXTRAD   2161
            DO 1041 K=1,KMAX                                   EXTRAD   2162
            TB(K,I)=TC(K,I)                                    EXTRAD   2163
            IPBNT(K,I)=IPCNT(K,I)                              EXTRAD   2164
     1041   CONTINUE                                           EXTRAD   2165
            DO 1042 IX=1,IAMAX                                 EXTRAD   2166
            IPB1(IX)=IPC1(IX)                                  EXTRAD   2167
            IPB2(IX)=IPC2(IX)                                  EXTRAD   2168
     1042   IPB3(IX)=IPC3(IX)                                  EXTRAD   2169
     9720   IF(ISCANF.NE.1.OR.NA.EQ.1)GO TO 1040               EXTRAD   2181
            NA =1                                              EXTRAD   2182
            NCELT=1                                            EXTRAD   2183
            GO TO 1044                                         EXTRAD   2184
     1040   DO 1 I=2,NCLM                                      EXTRAD   2185
            MH=-999                                            EXTRAD   2186
            IF (U(I-1).NE.-999) MH=IABS(U(I-1))                EXTRAD   2187
            IF (U(I).NE.-999) MH=MAX0(MH,IABS(U(I)))           EXTRAD   2188
            IF (U(I+1).NE.-999) MH=MAX0(MH,IABS(U(I+1)))       EXTRAD   2189
        1   MB(I)=MH                                           EXTRAD   2190
            RETURN                                             EXTRAD   2191
            END                                                EXTRAD   2192
```

```
      FUNCTION IUPK(IARY,I,J,K,IR,JR)                               EXTRAD  2193
C            RECALL FROM ARRAY                                      EXTRAD  2194
      DIMENSION IARY(1)                                             EXTRAD  2195
      DIMENSION ISF(6)                                              TEST1    246
      COMMON /MSKVAL/ VALMSK(5)                                     EXTRAD  2196
      COMMON /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB,  TEST   473
     +               JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,   TEST     474
     +                IR1,JR1,KR1,IMR                               TEST     475
      COMMON /ERROR/ IERR                                           EXTRAD  2198
      DATA IBYT /6/                                                 EXTRAD  2199
      DATA VALMSK /77774000000000000000B,                           EXTRAD  2200
     10003776000000000000B,                                         EXTRAD  2201
     20000017777000000000B,                                         EXTRAD  2202
     40000000000777400000B,                                         EXTRAD  2203
     50000000000000377600B,                                         EXTRAD  2204
     60000000000000001777B/                                         EXTRAD  2205
      DATA ISF/00000000000000000001B,00000000000000000200000B,      TEST1    247
     X         00000000000000400000B,00000000010000000000B,         TEST1    248
     X         00000020000000000000B,00040000000000000000B/         TEST1    249
      IADDR=1+((I-1)/IBYT)+(J-1+(K-1)*JR)*IR                        EXTRAD  2206
      IF(I.LE.IMR.AND.J.LE.JR1.AND.K.LE.KR1)GO TO 1                 EXTRAD  2207
      WRITE(6,100)I,J,K                                             EXTRAD  2208
  100 FORMAT(10X,21HARRAY OVERFLOW -I,J,K,3I10)                     EXTRAD  2209
      IADDR=IAMAX                                                   EXTRAD  2210
      IERR=2                                                        EXTRAD  2211
    1 IPOS=I-(I-1)/IBYT*IBYT                                        EXTRAD  2212
      IVAL=IARY(IADDR)                                              EXTRAD  2213
      ITWO=IBYT-IPOS                                                TEST1    250
      JOTA=IVAL  .AND. VALMSK(IPOS)                                 EXTRAD  2215
      IF(IPOS .GT. 2) GO TO 10                                      EXTRAD  2216
      ISFT=10*ITWO                                                  TEST1    251
      ISFT=60-ISFT                                                  EXTRAD  2217
      IUPK=SHIFT(JOTA,ISFT)                                         EXTRAD  2218
      GO TO 12                                                      EXTRAD  2219
   10 ITWO=ITWO+1                                                   TEST1    252
      IUPK=JOTA/ISF(ITWO)                                           TEST1    253
   12 RETURN                                                        EXTRAD  2221
      END                                                           EXTRAD  2222
```

```
      SUBROUTINE IPK(IARY,IDTA,I,J,K,IR,JR)                         EXTRAD  2223
      DIMENSION IARY(1)                                             EXTRAD  2224
      DIMENSION ISF(6)                                              TEST1    254
C           STUFF ARRAY                                             EXTRAD  2225
      COMMON /MSKVAL/ VALMSK(5)                                     EXTRAD  2226
      COMMCN /PWORK/ IPTC(22),TC(30,22),IPCNT(30,22),KMAX,T(50),JMXDB, TEST  476
     +              JMAX,IPC1(2640),IPC2(2640),IPC3(2640),IAMAX,    TEST     477
     +               IR1,JR1,KR1,IMR                                TEST     478
      COMMON /ERROR/ IERR                                           EXTRAD  2228
      DATA IBYT /6/                                                 EXTRAD  2229
      DATA ISF/00000000000000000001B,00000000000000000200000B,      TEST1    255
     X        00000000000000400000000B,00000000010000000000B,       TEST1    256
     X        00000020000000000000000B,00040000000000000000000B/    TEST1    257
      IDTA=IDTA.AND.VALMSK(6)                                       EXTRAD  2230
      IADDR=1+((I-1)/IBYT)+(J-1+(K-1)*JR)*IR                        EXTRAD  2231
      IF(I.LE.IMR.AND.J.LE.JR1.AND.K.LE.KR1) GO TO 1                EXTRAD  2232
      IADDR=IAMAX                                                   EXTRAD  2233
      IERR=3                                                        EXTRAD  2234
      WRITE(6,100)I,J,K                                             EXTRAD  2235
  100 FORMAT(10X,21HARRAY OVERFLOW -I,J,K,3I10)                     EXTRAD  2236
    1 IPOS=I-(I-1)/IBYT*IBYT                                        EXTRAD  2237
      ITWO=IBYT-IPOS                                                TEST1    258
      IF(IPOS .GT. 2) GO TO 10                                      EXTRAD  2239
      ISFT=ITWO*10                                                  TEST1    259
      IARY(IADDR)=IARY(IADDR) .AND..N. VALMSK(IPOS)                 EXTRAD  2240
      IARY(IADDR)=IARY(IADDR) .OR. SHIFT(IDTA,ISFT)                 EXTRAD  2241
      GO TO 12                                                      EXTRAD  2242
   10 ITWO=ITWO+1                                                   TEST1    260
      IARY(IADDR)=IARY(IADDR).AND..N.VALMSK(IPOS)                   TEST1    261
      IARY(IADDR)=IARY(IADDR).OR.(IDTA*ISF(ITWO))                   TEST1    262
   12 RETURN                                                        EXTRAD  2245
      END                                                           EXTRAD  2246
```

```
      SUBROUTINE PRANG                                                  EXTRAD  2247
C     ***************************************************************** EXTRAD  2248
C     VERSION 2.0   LEVEL 761119                                        EXTRAD  2249
C     JHW   CDC6600                                                     EXTRAD  2250
C     COMPUTES RANGES AND PRINTS THEM OUT FOR BSCAN MAPS.               EXTRAD  2251
C     ***************************************************************** EXTRAD  2252
      DIMENSION RSAVE(8)                                                EXTRAD  2253
      COMMON /INSUB/ TL(2),LT,TDW,DN,STARTR,DELTR,RN(4),SCON,CELWTH(3)  TEST     479
     1,ICOMP,VMIN,SVMIN,ESTART,DELT                                     TESTZ    157
      COMMON/ADATA/IDAY,IHOUR,IMIN,ISEC,NTP,NSF,NOD,NRC                 EXTRAD  2256
C     ----------------------------------------------------------------- EXTRAD  2257
      SCRA=SCON/ICOMP                                                   EXTRAD  2258
      RMAX=SCRA*(RN(NRC+1)-.5)*CELWTH(NTP+1)/1000.                      EXTRAD  2259
      D=RMAX/8.0                                                        EXTRAD  2260
      RSAVE(8)=RMAX                                                     EXTRAD  2261
      J=7                                                               EXTRAD  2262
      DO 10 I=1,7                                                       EXTRAD  2263
      RSAVE(J)=RSAVE(J+1)-D                                             EXTRAD  2264
      J=J-1                                                             EXTRAD  2265
   10 CONTINUE                                                          EXTRAD  2266
      WRITE(6,99)RSAVE                                                  EXTRAD  2267
   99 FORMAT(1H0,31X,20HRANGE SCALE (  KM  )/                           EXTRAD  2268
     X6X,2HAZ,4X,2HEL,1X,3HDAY,1X,6HHHMMM,1X,2HSS,6X,8F8.1,10H     PRF) EXTRAD  2269
      RETURN                                                            EXTRAD  2270
      END                                                               EXTRAD  2271
```

```
      SUBROUTINE PRN2(MODE)                                         EX2      207
C     * ********************************************************** EX2      208
C     PRINTS OUT DATA IN CODED MAP FORM AZIMUTH BY AZIMUTH.         EX2      209
C     VERSION 1.0   LEVEL 760320.                                   EX2      210
C     JHW   CDC 6600   AFGL                                         EX2      211
C     ************************************************************ EX2      212
      LOGICAL PRINT1,PRINT2,PRINT3,COPLOT,CONTRZ,CONTRV,CONTRS,VOLTAP  TEST     481
      DIMENSION IC(64),IUNIT(3)                                     EX2      214
      DIMENSION TYPE(3)                                             EX2      215
C     ------------------------------------------------------------ EX2      216
      INTEGER W,V,VS,SV,VB,VJ,WI,VSI,NCL                            TEST     482
      COMMON /PARM/ PRINT1,PRINT2,PRINT3,COPLOT,ICODES(36),A1,B1,A2,B2,  TEST     483
     +     CONTRZ,CONTRV,CONTRS,NFILE,NUMF,NREC,NUMR,VOLTAP         TEST     484
      COMMON /REFL/ W(173),WI(173),WJ(173),HR(173),NCL,NID,NIDP     TEST     485
      COMMON /VEL/ V(173),VB(173),VS(173),SV(173),VSI(173),         TEST     486
     +       SVI(173),HV(173),HS(173)                               TEST     487
      COMMON/AZM/ AZMUTH(660),NA,ELEVAT,PRF,KEEP                    EX2      222
      COMMON/ADATA/IDAY,IHOUR,IMIN,ISEC,NIP,NSF,NDD,NRC             EX2      223
      COMMON/INSUB/ TL(2),LT,TJW,DN,STARTR,STOPR,RN(4),SCON,CELWTH(3)  TEST1    263
     1,ICOMP,VMIN,SVMIN                                             TEST1    264
C     ------------------------------------------------------------ EX2      226
      DATA IUNIT/6,9,4/                                             EX2      227
      DATA TYPE/4HMEAN,3HVEL,5HPOWER/                               EX2      228
C     ------------------------------------------------------------ EX2      229
      IF(MODE.GT.1)GO TO 30                                         EX2      230
      DO 40 I=1,64                                                  TEST1    265
   40 IC(I)=1H                                                      TEST1    266
      I=0                                                           TEST1    267
      NCOL=RN(NRC+1)/ICOMP                                          EX2      231
      INT=(NCOL-1)/64+1                                             TEST     489
      DO 20 K=1,3                                                   EX2      233
      I=1                                                           EX2      234
      L=1                                                           EX2      235
      IU=IUNIT(K)                                                   EX2      236
    5 IV=0                                                          EX2      237
      IV1=0                                                         EX2      238
      IP2=0                                                         EX2      239
      IP=0                                                          EX2      240
      DO 10 N=1,INT                                                 EX2      241
      L=L+1                                                         EX2      242
      IF(L.GT.NRC.OR.L.GT.NCOL) GO TO 10                            TEST1    268
      IF(K .EQ. 1)IV2= V(L)                                         EX2      243
      IF(K .EQ. 2)IV2= SV(L)                                        EX2      244
      IF(K .EQ. 3)IV2= W(L)                                         EX2      245
      IF(IV2 .EQ. -999)IV1=IV1+IV2                                  EX2      246
      IF(IV2 .EQ. -999) GOTO 10                                     EX2      247
      IV=IV+IV2                                                     EX2      248
      IP2=IP2+1                                                     EX2      249
   10 IP=IP+1                                                       EX2      250
      IV1=IV1/IP                                                    EX2      251
      IF(IV1 .EQ. -999) IC(I)=14                                    EX2      252
      IF(IV1 .EQ. -999) GOTO 5                                      EX2      253
      IV=IV/IP2                                                     EX2      254
      IF(K .EQ. 1)IY=A2*IV+B2                                       EX2      255
      IF(K .GT. 1)IY=A1*IV+B1                                       EX2      256
      IF(IY .LE. 0) IY=1                                            EX2      257
      IF(IY .GT. 36) IY=36                                          EX2      258
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         5 IC(I)=ICODES(IY)                                          EX2     259
       6   I=I+1                                                     EX2     260
           IF(L.LT.NCOL.AND.L.LT.NRC.AND.I.LT.64) GO TO 3            TESTI   269
           WRITE(IU,100)AZMUTH(NA),ELEVAT,IDAY,IHOUR,IMIN,ISEC,IC    EX2     262
       100 FORMAT(1X,F5.1,F6.1,I4,1X,2I2,I3,5X,64A1)                 EX2     263
        20 CONTINUE                                                  EX2     264
           RETURN                                                    EX2     265
C                                                                    EX2     266
C                REWIND 2,3, AND PRINT V AND P                       EX2     267
C                                                                    EX2     268
      30   DO 35 K=2,3                                               EX2     269
           IU=IUNIT(K)                                               EX2     270
      31   REWIND IU                                                 EX2     271
           CALL PAGE                                                 EX2     272
           WRITE(6,101)TYPE(K)                                       EX2     273
     101   FORMAT(9H0 MAP OF ,A10)                                   EX2     274
           CALL PFANG                                                EX2     275
        34 READ(IU,100)AZMUT2,ELEVAT,IDAY,IHOUR,IMIN,ISEC,IC         EX2     276
           IF(EOF(IU))35,355,35                                      EX2     277
       355 CONTINUE                                                  EX2     278
           WRITE(6,100)AZMUT2,ELEVAT,IDAY,IHOUR,IMIN,ISEC,IC         EX2     279
           GOTO 34                                                   EX2     280
        35 CONTINUE                                                  EX2     281
           RETURN                                                    EX2     282
           END                                                       EX2     283
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      PROGRAM EXPAND      74/74    OPT=1             FTN 4.6+428      05/03/78  10.00.13      PAGE    1

            PROGRAM EXPAND(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE2)
      C*********************************************************************000110
      C              PROGRAM EXPAND  ERT NO. 175.                           000120
      C              AFGL  CDC 6600                                         000130
      C              R. OAESEN                                              000140
      C              EXPANDS AND DISPLAYS GIVEN AREAS OF RADAR IMAGERY.     000150
      C*********************************************************************000160
            DIMENSION PROGID(3),JSYM(4)
            COMMON/HEAD/TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG       000180
            COMMON/EXPAN/X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                    000190
            EQUIVALENCE (IXA,XA),(IYA,YA),(IXB,XB),(IYB,YB),(IXR,XBAR),
           X            (IYR,YBAR)
      C---------------------------------------------------------------------000200
            LOGICAL IPLT(4)
            LOGICAL Z1,Z2,Z3,Z4,LS,LK                                       000210
            DATA LS/.FALSE./,Z1/.TRUE./,Z2/.TRUE./,Z3/.TRUE./,Z4/.TRUE./    000220
            DATA LK/.FALSE./,XK1/-320.0/,XK2/320.0/,YK1/-320.0/,YK2/320.0/  000230
            DATA PROGID/7HCOLLINS,1H ,1H /,CSIZ/.07/,SSIZ/.05/
            DATA JSYM/1RC,1R.,1R+,1RX/
            DATA XTHET2/-180.0/,YTHET2/-90.0/                               000250
            DATA SCON/149.8962/,NCX/3/,XTIT/3H KM/,NSUBX/5/,XTHETA/0.0/     000260
            DATA XSIZ/0.2/,NCY/3/,YTIT/3H KM/,NSUBY/5/,YTHETA/90.0/,YSIZ/0.2/  000270
            DATA IPLT/4*.FALSE./
            NAMELIST /INPUT/ IPLT,Z1,Z2,Z3,Z4,LS,XK1,XK2,YK1,YK2,LK
      C---------------------------------------------------------------------000290
      C                                                                     000300
      C              INITIALIZE                                             000310
      C                                                                     000320
            CALL TIME(TITLE(5))                                             000330
            CALL DAY                                                        000340
            CALL PAGE                                                       000350
            CALL PLTID3(PROGID,100.,11.,1.)
            GO TO 1
          3 CALL PLOT(12.0,0.0,-3)
          1 READ(5,INPUT)                                                   000360
            IF(EOF(5))999,10                                                000370
         10 WRITE(6,INPUT)                                                  000380
            XLEN=XMAX-XMIN                                                  000400
            YLEN=YMAX-YMIN                                                  000410
            READ(2)RN,CELWTH,ELEVAT                                         000430
            IF(EOF(2))999,2
          2 WRITE(6,90)RN,CELWTH,ELEVAT
         90 FORMAT(1X,* RANGE=*,F6.0,* CELLWIDTH=*,F6.3,* ELEVATION=*,F6.2)  000450
            RANG=(SCON*(RN-.5)*CELWTH/1000.)/4.                             000460
            IF(.NOT.LS)GO TO 8                                              000470
            CALL NUSCAL(XK1,XK2,XLEN,XSTART,XEND,DELX)
            CALL NUSCAL(YK1,YK2,YLEN,YSTART,YEND,DELY)
            XK1=XSTART
            XK2=XEND
            YK1=YSTART
            YK2=YEND
            X1=XK1/RANG+.5*XLEN+XMIN                                        000480
            X2=XK2/RANG+.5*XLEN+XMIN                                        000490
            Y1=YK1/RANG+.5*YLEN+YMIN                                        000500
            Y2=YK2/RANG+.5*YLEN+YMIN                                        000510
            GO TO 9                                                         000520
          8 XK1=(X1-.5*XLEN-XMIN)*RANG                                      000530
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```
      XK2=(X2-.5*XLEN-XMIN)*RANG
      YK1=(Y1-.5*YLEN-YMIN)*RANG
      YK2=(Y2-.5*YLEN-YMIN)*RANG
      CALL NUSCAL(XK1,XK2,XLEN,XSTART,XEND,DELX)
      CALL NUSCAL(YK1,YK2,YLEN,YSTART,YEND,DELY)
      XDIFF1=ABS(XSTART-XK1)
      XDIFF2=ABS(XEND-XK2)
      YDIFF1=ABS(YSTART-YK1)
      YDIFF2=ABS(YEND-YK2)
      XDIFF1=XDIFF1/((XEND-XSTART)/XLEN)
      XDIFF2=XDIFF2/((XEND-XSTART)/XLEN)
      YDIFF1=YDIFF1/((YEND-YSTART)/YLEN)
      YDIFF2=YDIFF2/((YEND-YSTART)/YLEN)
      XK1=XSTART
      XK2=XEND
      YK1=YSTART
      YK2=YEND
    9 WRITE(6,95)XK1,YK1,XK2,YK2
   95 FORMAT(1X,* X1(KM)=*,F6.0,* Y1(KM)=*,F6.0,* X2(KM)=*,F6.0,
     1* Y2(KM)=*,F6.0)
      XI1=X1
      XI2=X2
      YI1=Y1
      YI2=Y2
      IF(.NOT.LS)GO TO 16
C
C              EXPAND THE FRAME
C
      SFX=(XMAX-XMIN)/(X2-X1)
      SFY=(YMAX-YMIN)/(Y2-Y1)
      X2=SFX*(X2-X1)+XMIN
      Y2=SFY*(Y2-Y1)+YMIN
      X1=XMIN
      Y1=YMIN
C
C              PLOT THE FRAME
C
   16 WRITE(6,98)X1,Y1,X2,Y2
   98 FORMAT(1X,* X1(IN)=*,F6.2,* Y1(IN)=*,F6.2,* X2(IN)=*,F6.2,
     1* Y2(IN)=*,F6.2)
      BEGX=XK1
      BEGY=YK1
      ENDX=XK2
      ENDY=YK2
      DELX=ABS(ENDX-BEGX)/5.
      DELY=ABS(ENDY-BEGY)/5.
C     IF(DELX.LT.1.)DELX=ABS(ENDX-BEGX)
C     IF(DELY.LT.1.)DELY=ABS(ENDY-BEGY)
C
      CALL LINLOG(XMIN,YMIN,XTIT,NCX,XLEN,NSUBX,XSTART,XEND,DELX,-1,
     1XTHETA,XSIZ,0.,0.,1)
      CALL LINLOG(XMIN,YMIN,YTIT,NCY,YLEN,NSUBY,YSTART,YEND,DELY,-1,
     1YTHETA,YSIZ,0.,0.,-1)
      CALL LINLOG(XMIN,YMAX,XTIT,0,XLEN,NSUBX,XSTART,XEND,DELX,-2,
     1XTHET2,XSIZ,0.,0.,1)
      CALL LINLOG(XMAX,YMIN,YTIT,0,YLEN,NSUBY,YSTART,YEND,DELY,-2,
     1YTHET2,YSIZ,0.,0.,-1)
   12 READ(2)XA,YA,KA
```

```
      IF(EOF(2))999,11
   11 IF(KA.NE.-999) GO TO 31
      CALL LABEL(IXA,IYA,ELEVAT,XSIZ)
      GO TO 3
   31 CONTINUE
      IF(XA.GT.1000.)BACKSPACE 2
      IF(XA.GT.1000.)GO TO 10
      IF(KA.GE.4000)GO TO 50
      READ(2)XB,YB,KB
      IF(EOF(2))999,13
   13 IF(KB.NE.-999) GO TO 32
      CALL LABEL(IXB,IYB,ELEVAT,XSIZ)
      GO TO 3
   32 CONTINUE
      IF(KB.GE.4000)GO TO 500
      XAS=XA-4.+.5*XLEN+XMIN
      IF(XA.LT.5.0)XAS=XA-4.+.5*XLEN+XMIN+XDIFF1
      IF(XA.GT.5.0)XAS=XA-4.+.5*XLEN+XMIN-XDIFF2
      XBS=XB-4.+.5*XLEN+XMIN
      IF(XB.LT.5.0)XBS=XB-4.+.5*XLEN+XMIN+XDIFF1
      IF(XB.GT.5.0)XBS=XB-4+.5*XLEN+XMIN-XDIFF2
      YAS=YA-4.+.5*YLEN+YMIN
      IF(YA.LT.5.0)YAS=YA-4.+.5*YLEN+YMIN+YDIFF1
      IF(YA.GT.5.0)YAS=YA-4.+.5*YLEN+YMIN-YDIFF2
      YBS=YB-4.+.5*YLEN+YMIN
      IF(YB.LT.5.0)YBS=YB-4.+.5*YLEN+YMIN+YDIFF1
      IF(YB.GT.5.0)YBS=YB-4+.5*YLEN+YMIN- YDIFF2
      IF(.NOT.LS)GO TO 18
C
C              EXPAND THE LINE
C
      XAS=(XAS-XI1)*SFX+XMIN
      XBS=(XBS-XI1)*SFX+XMIN
      YAS=(YAS-YI1)*SFY+YMIN
      YBS=(YBS-YI1)*SFY+YMIN
   18 WRITE(6,100)XA,YA,KA,XB,YB,KB,XAS,YAS,XBS,YBS
  100 FORMAT(1X,2(2F7.3,I5),T50,4F8.3)
C
C              PLOT THE LINE IF POSSIBLE
C
      IF(Z1.AND.KA.EQ.3001)GO TO 19
      IF(Z2.AND.KA.EQ.3002)GO TO 19
      IF(Z3.AND.KA.EQ.3003)GO TO 19
      IF(Z4.AND.KA.EQ.3004)GO TO 19
      GO TO 20
   19 CALL EXPAN1(XAS,YAS,XBS,YBS),RETURNS(20,12,40)
   20 WRITE(6,101)
  101 FORMAT(1H+,40X,*OUTSIDE PLOT AREA*)
      GO TO 12
   40 WRITE(6,102)
  102 FORMAT(1H+,40X,*ERROR, SKIP PLOT*)
      GO TO 12
C
C              PLOT THE CENTROID IF POSSIBLE
C
   50 IF(.NOT.LK)GO TO 3
      XBAR=XA
```

```
      YBAR=YA
      ID=KA
      GO TO 53
  500 IF(.NOT.LK)GO TO 3
      XBAR=XB
      YBAR=YB
      ID=KB
      GO TO 53
   51 READ(2)XBAR,YBAR,ID                                            001360
      IF(EOF(2))999,52                                               001370
   52 IF(ID.NE.-999) GO TO 53
      CALL LABEL(IXR,IYR,ELEVAT,XSIZ)
      GO TO 3
   53 CONTINUE
      XBARS=XBAR-4.+.5*XLEN+X4IN
      YBARS=YBAR-4.+.5*YLEN+Y4IN                                     001400
      IF(.NOT.LS)GO TO 60                                            001410
      XBARS=(XBARS-XI1)*SFX+X4IN
      YBARS=(YBARS-YI1)*SFY+Y4IN
   60 WRITE(6,103)XBAR,YBAR,ID,XBARS,YBARS                            001440
  103 FORMAT(1X,2F7.3,I5,T60,2F9.3)                                  001450
      IF(XBARS.LT.X1.OR.XBARS.GT.X2.OR.YBARS.LT.Y1.OR.YBARS.GT.Y2)   001460
     1GO TO 61                                                       001470
      IJKID=ID/1000
      JINDEX=IJKID-3
      IF(.NOT.IPLT(JINDEX))GO TO 51
      ISYM=JSYM(JINDEX)
      CALL SYMBOL(XBARS,YBARS,SSIZ,ISYM,XTHETA,0)
      IF(JINDEX.GE.3) GO TO 51
      FID=ID-IJKID*1000
      CALL NUMBER(XBARS+.5*CSIZ,YBARS-.5*CSIZ,CSIZ,FID,XTHETA,-1)    001500
      GO TO 51                                                       001510
   61 WRITE(6,101)                                                   001520
      GO TO 51                                                       001530
C                                                                    001540
C             TERMINATE PLOT                                         001550
C                                                                    001560
  999 CALL ENDPLT                                                    001570
      STOP                                                           001580
      END                                                            001590
```

```
      BLOCK DATA                                                        001600
      COMMON/HEAD/TITLE(6),ICODE,VERS,LEVEL,DAT,IRUN,NPAGE,NLOG         001610
      COMMON/LINUM/LINE                                                 001620
      COMMON/EXPAN/X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                      001630
      DATA X1/1.0/,X2/9.0/,Y1/1.0/,Y2/9.0/                              001640
      DATA XMIN/1.0/,XMAX/9.0/,YMIN/1.0/,YMAX/9.0/                      001650
      DATA TITLE/7HPROGRAM,7H EXPAND,1H ,1H ,1H ,1H /,                  001660
     1IRUN/0/,NPAGE/ 0/,ICODE/175/,VERS/1.0/,LEVEL/770331/              001670
      END                                                               001680
```

```
SUBROUTINE EXPAN1      74/74    OPT=1                    FTN 4.6+426        05/03/76  16.00.13       PAGE     1

            SUBROUTINE EXPAN1(XA,YA,XB,YB),RETURNS(N1,N2,N3)                      001690
      C*********************************************************************001700
      C              VERSION 1.0  LEVEL 77703317                                001710
      C              AFGL  CDC6600                                              001720
      C              SPECIAL EXPANDED IMAGE PLOTTING.                           001730
      C*********************************************************************001740
            COMMON/EXPAN/X1,X2,Y1,Y2,XMIN,XMAX,YMIN,YMAX                        001750
      C---------------------------------------------------------------------001760
      C                                                                         001770
      C              TEST IF LINE IS IN THE AREA                                001780
      C                                                                         001790
            IF(XA.LT.X1.AND.XB.LT.X1)RETURN N1                                  001800
            IF(XA.GT.X2.AND.XB.GT.X2)RETURN N1                                  001810
            IF(YA.LT.Y1.AND.YB.LT.Y1)RETURN N1                                  001820
            IF(YA.GT.Y2.AND.YB.GT.Y2)RETURN N1                                  001830
      C                                                                         001840
      C              TEST IF LINE IS TOTALLY IN THE AREA                        001850
      C                                                                         001860
            IF(XA.GE.X1.AND.XA.LE.X2.AND.XB.GE.X1.AND.XB.LE.X2.AND.             001870
           1YA.GE.Y1.AND.YA.LE.Y2.AND.YB.GE.Y1.AND.YB.LE.Y2)GO TO 49            001880
      C                                                                         001890
      C              TEST IF SLOPE IS INFINITE                                  001900
      C                                                                         001910
            IF((XB-XA).EQ.0.0)GO TO 17                                          001920
      C                                                                         001930
      C              TEST IF SLOPE IS ZERO                                      001940
      C                                                                         001950
            IF((YB-YA).EQ.0.0)GO TO 18                                          001960
      C                                                                         001970
      C              TEST IF POINT A IS IN THE AREA                             001980
      C                                                                         001990
            IF(XA.GE.X1.AND.XA.LE.X2.AND.YA.GE.Y1.AND.YA.LE.Y2)GO TO 20         002000
      C                                                                         002010
      C              TEST IF POINT B IS IN THE AREA                             002020
      C                                                                         002030
            IF(XB.GE.X1.AND.XB.LE.X2.AND.YB.GE.Y1.AND.YB.LE.Y2)GO TO 10         002040
      C                                                                         002050
      C              RESET POINTS TO CLOSEST SIDES                              002060
      C                                                                         002070
            SLOPB=(YB-YA)/(XB-XA)                                               002080
            B=YB-SLOPB*(XB-X1)                                                  002090
            IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.LT.X1)GO TO 4                         002100
            IF(B.GE.Y1.AND.B.LE.Y2.AND.XA.LT.X1)GO TO 5                         002110
            B=YB-SLOPB*(XB-X2)                                                  002120
            IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.GT.X2)GO TO 8                         002130
            IF(B.GE.Y1.AND.B.LE.Y2.AND.XA.GT.X2)GO TO 9                         002140
            SLOPA=1.0/SLOPB                                                     002150
            A=XB-SLOPA*(YB-Y1)                                                  002160
            IF(A.GE.X1.AND.A.LE.X2.AND.YB.LT.Y1)GO TO 6                         002170
            IF(A.GE.X1.AND.A.LE.X2.AND.YA.LT.Y1)GO TO 7                         002180
            RETURN N3                                                           002190
          4 XB=X1                                                               002200
            YB=B                                                                002210
            GO TO 10                                                            002220
          5 XA=X1                                                               002230
            YA=B                                                                002240
            GO TO 20                                                            002250
```

```
 6      YB=Y1                                               002260
        XB=A                                                002270
        GO TO 10                                            002280
 7      YA=Y1                                               002290
        XA=A                                                002300
        GO TO 20                                            002310
 8      XB=X2                                               002320
        YB=B                                                002330
        GO TO 10                                            002340
 9      XA=X2                                               002350
        YA=B                                                002360
        GO TO 20                                            002370
C                                                           002380
C               SWITCH POINTS A AND B                       002390
C                                                           002400
10      XS=XA                                               002410
        YS=YA                                               002420
        XA=XB                                               002430
        YA=YB                                               002440
        XB=XS                                               002450
        YB=YS                                               002460
        GO TO 20                                            002470
17      IF(YA.LT.Y1)YA=Y1                                   002480
        IF(YB.LT.Y1)YB=Y1                                   002490
        IF(YA.GT.Y2)YA=Y2                                   002500
        IF(YB.GT.Y2)YB=Y2                                   002510
        GO TO 49                                            002520
18      IF(XA.LT.X1)XA=X1                                   002530
        IF(XB.LT.X1)XB=X1                                   002540
        IF(XA.GT.X2)XA=X2                                   002550
        IF(XB.GT.X2)XB=X2                                   002560
        GO TO 49                                            002570
C                                                           002580
C               TEST FOR SIDE POINT A TO POINT B INTERSECTS 002590
C                                                           002600
20      SLOPB=(YB-YA)/(XB-XA)                               002610
        B=YB-SLOPB*(XB-X1)                                  002620
        IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.LT.X1)GO TO 22        002630
        B=YB-SLOPB*(XB-X2)                                  002640
        IF(B.GE.Y1.AND.B.LE.Y2.AND.XB.GT.X2)GO TO 24        002650
        SLOPA=1.0/SLOPB                                     002660
        A=XB-SLOPA*(YB-Y1)                                  002670
        IF(A.GE.X1.AND.A.LE.X2.AND.YB.LT.Y1)GO TO 26        002680
        A=XB-SLOPA*(YB-Y2)                                  002690
        IF(A.GE.X1.AND.A.LE.X2.AND.YB.GT.Y2)GO TO 28        002700
        RETURN N3                                           002710
22      YB=B                                                002720
        XB=X1                                               002730
        GO TO 49                                            002740
24      YB=B                                                002750
        XB=X2                                               002760
        GO TO 49                                            002770
26      XB=A                                                002780
        YB=Y1                                               002790
        GO TO 49                                            002800
28      XB=A                                                002810
        YB=Y2                                               002820
```

```
              C                                                                 002030
              C           PLOT THE LINE                                         002040
              C                                                                 002050
              49    CALL PLOT(XA,YA,3)                                          002060
                    CALL PLOT(XB,YB,2)                                          002070
                    RETURN N2                                                   002080
                    END                                                         002090
```

```
SUBROUTINE NUSCAL      74/74    OPT=1                     FTN 4.6+420        05/03/78  10.00.13         PAGE     1

              SUBROUTINE NUSCAL(X1,X2,XLEN,XSTART,XEND,DELX)
              DIMENSION DELTA(15)
              DATA DELTA /1.,2.,5.,10.,20.,25.,40.,50.,75.,100.,150.,200.,
             *250.,350.,500./
              XMAX=X2
              XMIN=X1
              IF(X2.LT.X1)XMAX=X1
              IF(X2.LT.X1)XMIN=X2
              DIFF=(XMAX-XMIN)/XLEN
              DIFF=ABS(DIFF)
              DO 10 J=2,15
              IF(DIFF.GT.DELTA(J-1).AND.DIFF.LE.DELTA(J))GO TO 20
        10    CONTINUE
              J=15
        20    DELX=DELTA(J)
              ISTART=XMIN/DELX
              XSTART=ISTART*DELX
              IF(XMIN.LT.0.0)XSTART=(ISTART-1)*DELX
              IEND=XMAX/DELX
              XEND=(IEND+1)*DELX
              IF(XMAX.LT.0.0)XEND=IEND*DELX
              RETURN
              END
```

```
SUBROUTINE LABEL       74/74    OPT=1                              FTN 4.6+428         05/03/78  16.00.13         PAGE      1

          SUBROUTINE LABEL(IX,IY,ELEVAT,XSIZ)
          DIMENSION LABL(3)
          DATA LABL/4HDAY ,6HTIME,6HEL   /
          CALL SYMBOL(.5,.01,XSIZ,LABL(1),0.,4)
          CALL NUMBER(2.0,0.01,XSIZ,IX,0.,-1)
          CALL SYMBOL(4.0,0.01,XSIZ,LABL(2),0.,4)
          CALL NUMBER (5.5,0.01,XSIZ,IY,0.,-1)
          CALL SYMBOL(7.0,0.01,XSIZ,LABL(3),0.,4)
          CALL NUMBER(8.5,0.01,XSIZ,ELEVAT,0.,1)
          RETURN
          END
```

```
      SUBROUTINE LINLOG (X,Y,BCD,N,PLTLEN,NUMSUB,BEGNUM,ENDNUM,
     *                   DEL   , NUMDEC, THETA, BCDSIZ,DRAW,XMOD,ITYPE)
C
C     PLOT LABELED LINEAR OR LOG AXIS
C
C     INPUT PARAMETERS
C
C        X         X CORD OF POINT BEGNUM IN INCHES
C        Y         Y CORD OF POINT BEGNUM IN INCHES
C        BCD       TITLE                NA10 FORMAT
C        N         NUMB. CHARACTERS IN BCD
C                       0=SUPRESS TITLE
C        PLTLEN    LENGTH IN INCHES ENTIRE AXIS
C        NUMSUB    NUMB. SUBDIV. BETWEEN MAJOR DIV.          (N.A. LOG)
C                      <2=NO SUBDIVISIONS
C                       2=DIVIDE MAJOR DIV. IN 1/2
C                       3=DIVIDE MAJOR DIV. IN 1/3
C                         ETC
C        BEGNUM    VALUE AT AXIS ORIGIN
C        ENDNUM    VALUE AT AXIS END
C        DEL       ABS OF DELTA VALUE BETWEEN MAJOR DIV.
C                      -DEL = START DIVISIONS AT ENDNUM
C        NUMDEC    NUMB. PLACES AFTER DEC. PT.
C                      .LT. -1   =   SUPRESS NUMBERS
C        THETA     AXIS ANGLE
C                         0       X-AXIS   BOTTOM           LEFT  TO RIGHT
C                      -180       X-AXIS   TOP              LEFT  TO RIGHT
C                      +180       X-AXIS   USED AS Y        LEFT  TO RIGHT
C                        90       Y-AXIS   LEFT               BOT TO TOP
C                       -90       Y-AXIS   RIGHT              BOT TO TOP
C                       270       Y-AXIS   USED AS X          BOT TO TOP
C        BCDSIZ    LETTER SIZE IN INCHES
C                       CLEARANCE NEEDED 3.1 *BCDSIZ
C        DRAW      LENGTH IN INCHES OF MAJOR DIVISION LINES
C                       0.0=SUPRESS LINES
C        XMOD      MODULO VALUE FOR MAJOR DIVISION
C                       0.0=NON-CYCLICAL
C        ITYPE       1= LINEAR AXIS NORMAL TITLE            DEFALT=1
C                    2= LOG    AXIS NORMAL TITLE  EXP ONLY
C                    3= LOG    AXIS NORMAL TITLE  BASE 10 & EXP
C                    4= LOG    AXIS NORMAL TITLE  BASE  E & EXP
C                   -1= LINEAR AXIS VERT   TITLE
C                   -2= LOG    AXIS VERT   TITLE  EXP ONLY
C                   -3= LOG    AXIS VERT   TITLE  BASE 10 & EXP
C                   -4= LOG    AXIS VERT   TITLE  BASE  E & EXP
C
      DIMENSION BCD(1)
C
C     SET ORIENTATION AND SIZE PARAMETERS
C
      ISPEC=0
      IF(DEL .LT. 0.0) ISPEC=1
      KIND=ITYPE
      IF((IABS(ITYPE) .LT. 1) .OR.  (IABS(ITYPE) .GT. 4)) KIND=1
      DELNUM=ABS(DEL)
```

```
      ON =BEGNUM
      OFF=ENDNUM
      IF(BEGNUM .LT. ENDNUM) GO TO 5
      ON =ENDNUM
      OFF=BEGNUM
      DELNUM=-DELNUM
C
5      NUMDIV=ABS((ENDNUM-BEGNUM)/DELNUM)
      DIVLEN=PLTLEN/   ABS((ENDNUM-BEGNUM)/DELNUM)
      HEIGHT=BCDSIZ*0.75
      VRTSIZ=BCDSIZ+(0.25*BCDSIZ)
      SUPER=HEIGHT/2.0   $   SIZTEN=HEIGHT*0.75
      SINANG=SIN(THETA/57.2958)
      COSANG=COS(THETA/57.2958)
      SIN1=ABS(SINANG)
      COS1=ABS(COSANG)
      THET2=THETA
      IF(THETA .EQ. -180.0) THET2= 0.0
      IF(THETA .EQ.  270.0) THET2=90.0
      SIGNER=1.0
      IF(THETA .LE.   45.0) SIGNER=-1.0
      IF(THETA .EQ.  -90.0) SIGNER=1.0
      TICANG=THETA+(90.0*SIGNER)
      TICSIZ =(0.20 * HEIGHT)+ .10
      SIZTIC =0.50 * TICSIZ
      XEND=X+(PLTLEN*COS1)
      YEND=Y+(PLTLEN*SIN1)
C
      IF(IABS(KIND) .GE. 2) GO TO 10
C
      SUBDIV = 0
      IF(NUMSUB .LE. 0) GO TO 99
      SUBDIV=DIVLEN/FLOAT(NUMSUB)
      SUBNUM=DELNUM/FLOAT(NUMSUB)
      GO TO 99
C
10    NUMTIC=1
      IF(DIVLEN .LT. 1.0) NUMTIC=2
C
99    DIVOFF=HEIGHT*((1.25*SIGNER)-0.5)
      IF((THETA .EQ. -180.) .OR. (THETA .EQ. 270.)) DIVOFF=DIVOFF+HEIGHT
C
C     CYCLING LOOP
C
      N1=NUMDIV +1
      DO 999 I=1,N1
      CYCLES=I-1
      DIVTIC = CYCLES * DIVLEN
      TICX = X +(DIVTIC * COS1)
      TICY = Y +(DIVTIC * SIN1)
      IF(ISPEC .EQ. 1) TICX=XEND-(DIVTIC*COS1)
      IF(ISPEC .EQ. 1) TICY=YEND-(DIVTIC*SIN1)
C
C     DRAW DIVISION NUMBERS
C
```

```
      IF(NUMDEC .LT. (-1)) GO TO 301
      DIVNUM = BEGNUM +(CYCLES * DELNUM)
      IF(ISPEC .EQ. 1) DIVNUM=ENDNUM-(CYCLES*DELNUM)
      IF(XMOD .EQ. 0.0) GO TO 102
101   IF(DIVNUM .LT. XMOD) GO TO 102
      DIVNUM=DIVNUM-XMOD
      GO TO 101
102   PLACES = 0.
      IF (DIVNUM .NE. 0.)  PLACES = AINT (ALOG10 (ABS (DIVNUM)))
      OFFSET = -.50 * HEIGHT * (PLACES + FLOAT (NUMDEC) + 1.25)
      IF((THETA.EQ.-180.).OR.(THETA.EQ. 270.)) OFFSET=-OFFSET
      XP=TICX+(OFFSET*COSANG)-(DIVOFF*SINANG)
      YP=TICY+(OFFSET*SINANG)+(DIVOFF*COSANG)
      IF(IABS(KIND) .GT. 2) GO TO 201
      CALL NUMBER (XP,YP,HEIGHT,DIVNUM,THET2,NUMDEC)
      GO TO 301
C
C     SPECIAL LABEL LOG BASE 10 OR E & EXP
C
201   IF(IABS(KIND) .EQ. 3) CALL NUMBER (XP,YP,SIZTEN,10.,THET2,-1)
      IF(IABS(KIND) .EQ. 4) CALL SYMBOL (XP,YP,SIZTEN,1HE,THET2, 1)
      IF(THETA .EQ.    0.0) GO TO 202
      IF(THETA .EQ. -180.0) GO TO 202
      IF(THETA .EQ.   90.0) GO TO 203
      IF(THETA .EQ.  270.0) GO TO 203
      IF(THETA .EQ.  180.0) GO TO 204
      IF(THETA .EQ. - 90.0) GO TO 205
202   XPS=XP+HEIGHT  $  YPS=YP+HEIGHT  $  GO TO 299
203   XPS=XP-HEIGHT  $  YPS=YP+HEIGHT  $  GO TO 299
204   XPS=XP-HEIGHT  $  YPS=YP-HEIGHT  $  GO TO 299
205   XPS=XP+HEIGHT  $  YPS=YP-HEIGHT  $  GO TO 299
299   CALL NUMBER (XPS,YPS,SUPER,DIVNUM,THET2,NUMDEC)
C
C
C     DRAW DIVISION TICS
C
301   CALL SYMBOL (TICX, TICY, TICSIZ, 13, THETA, -1)
C
C     DRAW MAJOR DIVISION LINES
C
      IF( DRAW .EQ. 0.0) GO TO 302
      XXXX=TICX+(DRAW*SINANG)
      YYYY=TICY+(DRAW*COSANG)
      IF(THETA .EQ. 180.0) YYYY=TICY+DRAW
      CALL PLOT (XXXX,YYYY,2)
C
302   IF(IABS(KIND) .GE. 2) GO TO 304
C
C     DRAW SUBDIVISION TICS LINEAR AXIS
C
      IF (NUMSUB .LE. 1) GO TO 999
      DO 303  J = 2, NUMSUB
      TEST=(BEGNUM+(CYCLES*DELNUM)) + (FLOAT(J-1)*SUBNUM)
      IF((TEST  .LT. ON) .OR. (TEST .GT. OFF)) GO TO 303
      SUBTIC = SUBDIV * FLOAT (J - 1)
```

```
      IF(ISPEC .EQ. 1) SUBTIC=-SUBTIC
      XS=TICX+(SUBTIC*COS1)
      YS=TICY+(SUBTIC*SIN1)
      CALL SYMBOL (XS,YS,SIZTIC,15,TICANG,-1)
303   CONTINUE
      GO TO 999
C
C     DRAW SUBDIVISION TICS LOG    AXIS
C
304   IF(I .GE. N1) GO TO 999
      DO 305 J=2,9,NUMTIC
      TICLOG=DIVLEN*ALOG10(FLOAT(J))
      IF(DELNUM .LT. 0) TICLOG=       -TICLOG
      XS=TICX+(TICLOG*COS1)
      YS=TICY+(TICLOG*SIN1)
      CALL SYMBOL (XS,YS,SIZTIC,15,TICANG,-1)
305   CONTINUE
C
999   CONTINUE
C
C     DRAW AXIS LINE
C
      CALL PLOT (XEND,YEND,3)
      CALL PLOT (X   ,Y   ,2)
C
      IF (N .EQ. 0)  RETURN
      IF(KIND .LT. 0) GO TO 1001
C
C     CENTER NORMAL TITLE
C
      SIGN1=1.0
      IF((THETA .EQ. 0.0) .OR. (THETA .EQ. 270.0)) SIGN1=-1.0
      SIGN2=-SIGN1
      IF((THETA .LT. 0.0) .OR. (THETA .EQ. 270.0)) SIGN2=SIGN1
      BCDOFF=(HEIGHT*((3.25*SIGN1)-0.5))*SIGN2
      OFFCEN=0.5*(PLTLEN-(FLOAT(N)-0.5)*BCDSIZ)
      IF((THETA .EQ. 180.) .OR. (THETA .EQ. -90.))
     *                OFFCEN=OFFCEN+(BCDSIZ*FLOAT(N))
      XC=X+(OFFCEN*COS1)+(BCDOFF*SIN1)
      YC=Y+(OFFCEN*SIN1)+(BCDOFF*COS1)
      CALL SYMBOL (XC,YC,BCDSIZ,BCD,THET2,N)
      RETURN
C
C     CENTER VERT. TITLE
C
1001  THET3=90.0
      IF((ABS(THETA) .EQ. 90.0) .OR. (THETA .EQ. 270.0)) THET3= 0.0
      SIN3=SIN(THET3/57.2958)
      COS3=COS(THET3/57.2958)
      OFFCEN=(0.5*(PLTLEN-(FLOAT(N)*VRTSIZ)))+BCDSIZ
      OFFCEN=OFFCEN+(COS3*(FLOAT(N-2)*VRTSIZ))
      SIGN3=1.0
      IF((THETA .GE. 0.0) .AND. (THETA .LT. 270.0)) SIGN3=-1.0
      BCDOFF= HEIGHT*((3.25*SIGN3)-0.5)
      YC=Y+(OFFCEN*COS3)+(BCDOFF*SIN3)
```

```
      XC=X+(OFFCEN*SIN3)+(BCDOFF*COS3)
C
      II=1
      DO 1002 I=1,N
      JCH=MOD(I,10)
      IF(JCH .EQ. 0) JCH=10
      IRIGHT=NXGETX (BCD(II),JCH ,1)
      LEFT  =NXPUTX (IRIGHT ,LEFT,1)
      CALL SYMBOL (XC,YC,BCDSIZ,LEFT,THET3,1)
      IF(MOD(I,10) .EQ. 0) II=II+1
      XC=XC+(VRTSIZ*SIN3)
      YC=YC-(VRTSIZ*COS3)
 1002 CONTINUE
      RETURN
      END
```

```
      PROGRAM ASOCCL (INPUT,OUTPUT,TAPE1,TAPE2,TAPE5=INPUT,TAPE6=OUTPUT)000100
      LOGICAL PR1,PR2,PR3,PR4                                           000110
       COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                        000120
      COMMON /INPUT1/ IDEV1,IDEV2                                       000125
      CALL INIT                                                         000131
    5 CALL PRM                                                          000136
      IF(ISTOP .EQ. 1) STOP                                             000137
      CALL INPUT                                                        000140
      CALL TRACK                                                        000143
      IF(ITYPE.NE.6) GO TO 5
      REWIND IDEV2                                                      000147
      GOTO 5                                                            000148
      END                                                               000149
```

```
          SUBROUTINE INIT                                                    000170
          LOGICAL PR1,PR2,PR3,PR4                                            000173
          COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                          000176
          COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IMDMX,ICMPMX
          COMMON /DATA/ VCL(13,100,3),ECL(10,200),IMVCL(25),ICMPRL(10)
          IF(PR4) PRINT 100                                                  000185
    100   FORMAT(1X,*INIT*)                                                  000188
          ISTOP=0                                                            000191
          IELSCN=0                                                           000194
          IVLSCN=0                                                           000197
          DO 10 IX=1,3                                                       000200
          DO 10 JX=1,100                                                     000203
          DO 10 KX=1,13                                                      000206
    10    VCL(KX,JX,IX)=0.                                                   000209
          RETURN                                                             000210
          END                                                                000212
```

```
      BLOCK DATA                                                        000270
      LOGICAL PR1,PR2,PR3,PR4                                           000280
      COMMON /DATA/ VCL(13,100,3),ECL(10,200),IHVCL(25),ICMPRL(10)
      COMMON/PNTRS/ IVCLS,IHVCLS,IECLM,IVCLP,IVCLC,ICMPRS               000300
      COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IHDMX,ICMPMX
      COMMON/ANCIL/ ELANG,IDAY,IHR,MIN,ISEC                             000320
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                         000330
      COMMON /INPUT1/ IDEV1,IDEV2                                       000335
      DATA IATR/9,7,9,7,5/
      DATA ITYPE/1/,IVCLMX/100/,IHDMX/25/
      DATA PR1/.F./,PR2/.F./,PR3/.F./                                   000350
      DATA IDEV1/1/,IDEV2/1/,ISTOP/1/                                   000355
      DATA ICMPMX/10/                                                   000357
      END                                                               000360
```

```
      SUBROUTINE INPUT                                                000370
      DIMENSION IECL(10,200)
      LOGICAL PR1,PR2,PR3,PR4                                         000380
      COMMON /DATA/ VCL(13,100,3),ECL(10,200),IWVCL(25),ICMPRL(10)
      COMMON /PNTRS/ IVCLS,IHVCLS,IECLM,IVCLP,IVCLC,ICMPPS            000400
      COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IHDMX,ICMPMX
      COMMON /ANCIL/ ELANG,IDAY,IHR,MIN,ISEC                          000420
      COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                       000430
      COMMON /INPUT1/ IDEV1,IDEV2                                     000440
      EQUIVALENCE(IECL(10,200),ECL(10,200))
      ILIMIT=0                                                        000445
20     READ (IDEV2) ITYPE,IECLM                                       000480
      IF(EOF(IDEV2)) 12,3                                             000490
3     N=1                                                             000500
      IF(PR1) PRINT 220,N,ITYPE,IECLM                                 000510
5     IF(ITYPE .NE. 0) GOTO 7                                         000520
C    INPUT EL. ANG. AND TIME                                          000530
      READ (IDEV1) ELANG,IDAY,IHR,MIN,ISEC                            000540
     X,AZMUTH1,AZMUTH2
      IF(EOF(IDEV1)) 12,6                                             000550
6     N=2                                                             000560
      IF(PR1) PRINT 205,N,ELANG,IDAY,IHR,MIN,ISEC                     000570
     X,AZMUTH1,AZMUTH2
      GOTO 20                                                         000580
7     IF(IECLM.LE.200) GO TO 9
      IECLR=IECLM-200
      IECLM=200
C  GET NUMBER OF ATTRIBUTES FOR RECORD TYPE                           000660
9     MATR=IATR(ITYPE)                                                000670
      DO 10 IX=1,IECLM                                                000680
      READ(IDEV2)(IECL(JX,IX),JX=1,MATR)
      IF(EOF(IDEV2)) 12,10                                            000700
10    CONTINUE                                                        000710
      IF(ILIMIT .EQ. 0) GOTO 23                                       000711
      DO 13 IX=1,IECLR                                                000712
      READ (IDEV2)                                                    000713
      IF(EOF(IDEV2)) 12,13                                            000714
13    CONTINUE                                                        000715
23     N=3                                                            000720
      M=MATR-1
      L=M-2
      IF(ITYPE.NE.3) GO TO 15
      IF(PR1) PRINT 210,N,MATR
      DO 30 JX=1,IECLM
      IF(ITYPE.GT.2) GO TO 31
      IF(PR1) PRINT 211,((IECL(IX,JX),IX=1,2),L,(ECL(IX,JX),IX=3,M),
     X(IECL(MATR,JX)))
      GO TO 30
31    IF(PR1) PRINT 212,M,(ECL(IX,JX),IX=1,M),IECL(MATR,JX)
30    CONTINUE
      GOTO 15                                                         000740
12    PRINT 230                                                       000750
220   FORMAT(1X,I2,1X,I3,2X,I4)                                       000760
205   FORMAT(1X,I2,2X,F6.3,2X,I3,2X,I2,2X,I3,2X,I3,2F10.2)
210   FORMAT(1X,2I10)
211   FORMAT(1X,2I10,=(1X,F8.2),I10)
212   FORMAT(1X,=(1X,F8.2),I10)
```

```
      230 FORMAT(2X,*EOF REACHED ON TAPE1*)
       15 RETURN
          END
```

```
          SUBROUTINE TRACK                                                  000820
          COMMON /DATA/ VCL(13,100,3),ECL(13,200),IHVCL(25),ICMPRL(10)
          COMMON /PNTRS/ IVCLS,IHVCLS,IECLM,IVCLP,IVCLC,ICMPRS              000840
          COMMON /CNTRS/ IELSCN,IVLSCN,IATR(5),MATR,IVCLMX,IHOMX,ICMPMX
          COMMON /ANCIL/ ELANG,IDAY,IHR,MIN,ISEC                            000860
          COMMON /FLGS/ ITYPE,PR1,PR2,PR3                                   000870
          LOGICAL PR1,PR2,PR3,PR4                                           000880
          DATA RPD/.017453/                                                 000890
          PRINT 400,ITYPE                                                   000900
          IF(ITYPE .NE. 3) RETURN
  400     FORMAT(1X,*TRACK*,I7)                                             000920
          IF(IVLSCN .EQ. 0 .AND. IELSCN .EQ. 0) ELANGP=0.                   000930
C ASSUME VEL=30 M/SEC
          VEL=.03
          SINEL=SIN(ELANG*RPD)
          TANEL=TAN(ELANG*RPD)                                              000940
          COSPHI=COS(ELANG*RPD)                                             000950
          COSPHI2=COSPHI*COSPHI                                             000960
          PRINT 410,TANEL,COSPHI,COSPHI2,ELANG,ELANGP,IELSCN,IVLSCN         000970
  410     FORMAT(1X,3(1X,F10.6),1X,2(1X,F7.3),2I6)                          000980
          IF(ELANGP .GT. ELANG) IELSCN=0                                    000990
          IF(ELANGP .GT. ELANG) GOTO 45                                     001000
  3       IELSCN=IELSCN+1                                                   001010
          IF(IELSCN .EQ. 1 .AND. IVLSCN .EQ. 0) GOTO 5                      001020
          IF(IELSCN .EQ. 1) GOTO 15                                         001030
          GOTO 25                                                           001040
C    INITIALIZE VOL. CELL TABLE POINTERS                                    001050
  5       IVCLS=1                                                           001060
          IHVCLS=1                                                          001070
          IVCLP=1                                                           001080
          IVCLC=1                                                           001090
C    ENTRY FOR FIRST SCAN OF NEW VOLUME SCAN                                001100
          PRINT 420,IECLM                                                   001110
  420     FORMAT(1X,*TRACK1                          IECLM=*,I6)            001120
  15      DO 13 JX=1,IECLM                                                  001130
C    INITIAL CELLS                                                          001140
C    CALCULATE SURFACE COORDINATES                                          001150
          T1=((IDAY*24+IHR)*60+IMIN)*60+ISEC
          XS=ECL(3,JX)*COSPHI                                               001160
          YS=ECL(4,JX)*COSPHI                                               001170
          RS=SQRT((XS*XS)+(YS*YS))                                          001180
          HT=RS*TANEL                                                       001510
          VCL(1,IVCLS,ITYPE)=XS                                             001200
          VCL(2,IVCLS,ITYPE)=YS                                             001210
          VCL(3,IVCLS,ITYPE)=RS
          VCL(4,IVCLS,ITYPE)=HT                                             001230
          VCL(5,IVCLS,ITYPE)=ECL(2,JX)
          VCL(6,IVCLS,ITYPE)=IDAY                                           001250
          VCL(7,IVCLS,ITYPE)=IHR                                            001260
          VCL(8,IVCLS,ITYPE)=MIN                                            001270
          VCL(9,IVCLS,ITYPE)=ISEC                                           001280
          VCL(10,IVCLS,ITYPE)=ECL(2,JX)*COSPHI
          VCL(11,IVCLS,ITYPE)=ECL(1,JX)
          VCL(12,IVCLS,ITYPE)=ECL(7,JX)                                     001310
          N=1                                                               001320
          IF(PR2) PRINT 300,JX,IVCLS,(VCL(KK,IVCLS,ITYPE),KK=1,13)          001330
C    CHECK FOR OVERFLOW OF VCL                                              001340
```

```
              IVCLS=IVCLS+1                                          001350
              IF(IVCLS .LE. IVCLMX) GOTO 13                          001360
              PRINT 310                                              001370
              IVCLS=IVCLMX                                           001380
        310   FORMAT(2X,*VCL LIMIT REACHED*)                         001390
        13    CONTINUE                                               001400
        C     MOVE UP  VCL SEGMENT PNTR(END)                         001410
              IVCLC=IVCLS-1                                          001420
              FLANGP=ELANG                                           001421
              IF(PR22) PRINT 430,IVCLS,IVCLC,IVCLP                   001422
        430   FORMAT(1X,*INIT. VOL. CELLS*/*IVCLS=*,I4,2X,*IVCLC=*   001424
             1,I4,2X,*IVCLP=*,I4)                                    001426
              GOTO 100                                               001430
        C   ASSOCIATE ELEV. CELLS TO BUILD VOL CELLS                 001440
        25    PRINT 435                                              001442
        435   FORMAT(1X,*ASSOC. EL. CELLS*)                          001444
              DO 40 JX=1,IECLM                                       001450
        C   GET SURFACE PARAMETERS OF 2REV. ELEV. CELL               001460
              T2=((IDAY*24+IHR)*60+IMIN)*60+ISEC
              DT=T2-T1
              ELXS=ECL(3,JX)*COSPHI
              ELYS=ECL(4,JX)*COSPHI
              RS=SQRT((ELXS*ELXS)+(ELYS*ELYS))                       001500
              HT=RS*TANEL                                            001190
              AREAS=ECL(2,JX)*COSPHI
              ICMPRS=1                                               001514
              DO 305 IX=1,ICMPMX                                     001516
        305   ICMPRL(IX)=0                                           001518
              IF(PR3) PRINT 450,2HEL,JX,ELYS,ELXS,RS,HT,AREAS        001523
        450   FORMAT(1X,A2,1X,*CELL*,1X,I3,1X,5E12.4)                001524
              DO 30 IX=IVCLP,IVCLC                                   001525
              VCLDIS=SQRT(VCL(10,IX,ITYPE))+SQRT(AREAS)*1.+VEL *DT
              XS2=VCL(1,IX,ITYPE)+VCLDIS                             001540
              XS1=VCL(1,IX,ITYPE)-VCLDIS                             001550
              YS2=VCL(2,IX,ITYPE)+VCLDIS                             001560
              YS1=VCL(2,IX,ITYPE)-VCLDIS                             001570
              IF(PR4) PRINT 500,IX,VCLDIS,XS2,XS1,YS2,YS1            001572
        500   FORMAT(1X,I4,1X,5E12.4)                                001574
              IF(ELXS .LT. XS1 .OR. ELXS .GT. XS2) GOTO 30           001580
              IF(ELYS .LT. YS1 .OR. ELYS .GT. YS2) GOTO 30           001590
        C   COMPARE-INSERT VCL INDEX INTO ICMPRL LIST                001591
              ICMPRL(ICMPRS)=IX                                      001593
              ICMPRS=ICMPRS+1                                        001595
              IF(ICMPRS .LE. ICMPMX)GOTO 301                         001597
              IERR=2                                                 001599
              ICMPRS=ICMPMX                                          001601
        301   CONTINUE                                               001603
        30    CONTINUE                                               001610
              KX2=2                                                  001611
              IF(ICMPRL(1) .EQ. 0) GOTO 33                           001612
              IX=ICMPRL(1)                                           001614
              IF(ICMPRL(2) .NE. 0) GOTO 3301                         001613
              GOTO 35                                                001615
        3301  CONTINUE
        332   INEW=ICMPRL(KX2)                                       001617
              X1=VCL(1,ICMPR,ITYPE)                                  001618
              Y1=VCL(2,ICMPR,ITYPE)                                  001619
```

```
            X2=VCL(1,INEW,ITYPE)                                      001620
            Y2=VCL(2,INEW,ITYPE)                                      001621
            DIS1=SQRT((ELXS-X1)**2+(ELYS-Y1)**2)                      001622
            DIS2=SQRT((ELXS-X2)**2+(ELYS-Y2)**2)                      001623
            IF(DIS2 .LT. DIS1) ICMPR=INEW                             001624
            KX2=KX2+1                                                 001625
            IF(ICMPRL(KX2) .EQ. 0) GOTO 35                            001626
            GOTO 333                                                  001627
C     NEW VOL. CELL-ADD TO LIST                                       001628
 33         IF(P23) PRINT 460,2HVL,IX,VCLDIS,XS1,XS2,YS1,YS2          001629
            VCL(1,IVCLS,ITYPE)=ELXS                                   001630
            VCL(2,IVCLS,ITYPE)=ELYS                                   001640
            VCL(3,IVCLS,ITYPE)=RS
            VCL(4,IVCLS,ITYPE)=HT                                     001660
            VCL(5,IVCLS,ITYPE)=ECL(2,JX)
            VCL(6,IVCLS,ITYPE)=IDAY                                   001680
            VCL(7,IVCLS,ITYPE)=IHR                                    001690
            VCL(8,IVCLS,ITYPE)=MIN                                    001700
            VCL(9,IVCLS,ITYPE)=ISEC                                   001710
            VCL(10,IVCLS,ITYPE)=AREAS                                 001720
            VCL(11,IVCLS,ITYPE)=ECL(1,JX)
            VCL(12,IVCLS,ITYPE)=ECL(7,JX)                             001740
            IVCLS=IVCLS+1                                             001750
C     CHECK FOR OVERFLOW OF VC                                        001760
            IF(IVCLS .LE. IVCLMX) GOTO 40                             001770
            PRINT 310                                                 001780
            IVCLS=IVCLMX                                              001790
            GOTO 40                                                   001800
C     ELEV. CELLS COMPARE UPDATE ATTRIBUTES                           001810
C     REPLACE WITH NEW HEIGHT                                         001820
        35 CONTINUE
            IF(P23) PRINT 460,IX,JX,HT,AREAS                          001822
 460        FORMAT(1X,*UPDATE VCL*,1X,I4,1X,*WITH ECL.*,1X,I4         001824
           1,2X,2E12.4)                                               001826
            VCL(3,IX,ITYPE)=RS
            IF(AREAS .LE. VCL(3,IX,ITYPE)) GOTO 40                    001840
            VCL(4,IX,ITYPE)=HT                                        001850
            VCL(5,IX,ITYPE)=AREAS                                     001860
 40         CONTINUE                                                  001870
            N=2                                                       001880
            IF(P22) PRINT 320,N,IVCLS,((VCL(IX,JX,ITYPE),IX=1,17),JX=1,IVCLS) 001890
C     AFTER COMPARING ALL NEW ELEV. CELLS MOVE UP SEGMENT END PNTR    001900
            IVCLC=IVCLS-1                                             001910
            ELANGP=ELANG                                              001915
            GOTO 100                                                  001920
C     PROCESS VOL TRACK BEFORE PROCESSING NEW ELEVATION CELLS         001930
 45         IVLSCN=IVLSCN+1                                           001940
            IF(IVLSCN .GT. 1) GOTO 50                                 001950
C     CREATE VOL LIST HEAD TABLE                                      001960
            IVCLC1=IVCLC                                              001970
            IF(IVCLC .LE. IHDMX) GOTO 48                              001980
            PRINT 330,IHDMX                                           001990
 330        FORMAT(2X,*IVCLC .GT.*,2X,I5)                             002000
            IVCLC1=IHDMX                                              002010
 48         DO 47 IX=1,IVCLC1                                         002020
 47         IHVCL(IX)=IX                                              002030
            IHVCLS=IVCLC1+1                                           002040
```

```
      IF(IHVCLS .LE. IHDMX)GOTO 52
      PRINT 340,IHDMX
  340 FORMAT(2X,*IHVCLS .GT.*,2X,I5)
      IHVCLS=IHDMX
C     MOVE UP VOL CELL SEGMENT POINTER(BEGINNING)
   52 IVCLP=IVCLC+1
      IF(PR3) PRINT 350,IHVCLS,(IHVCL(IX),IX=1,IHVCLS)
C     GO PROCESS FIRST EL. SCAN OF NEW VOL SCAN
      GO TO 15
C     MAX  IHVCL FOR TRACK COMPARE
   50 IHVCLM=IHVCLS-1
      DO 60 JX=IVCLP,IVCLC
      DO 55 IX=1,IHVCLM
      IXCEL=IHVCL(IX)
C     POINTER TO VOL. CELL
      XS=VCL(1,IXCEL,ITYPE)
      YS=VCL(2,IXCEL,ITYPE)
      VCLDIS=SQRT(VCL(10,IXCEL,ITYPE))+SQRT(AREAS)*1.+VEL*DT
      XS1=XS-VCLDIS
      XS2=XS+VCLDIS
      YS1=YS-VCLDIS
      YS2=YS+VCLDIS
      XS3=VCL(1,JX,ITYPE)
      YS3=VCL(2,JX,ITYPE)
      IF(XS3 .LT. XS1 .OR. XS3 .GT. XS2) GOTO 55
      IF(YS3 .LT. YS1 .OR. YS3 .GT. YS2) GOTO 55
      GOTO 57
   55 CONTINUE
C     NEW HEAD VOL. CELL
      IHVCL(IHVCLS)=JX
      IHVCLS=IHVCLS+1
      IF(IHVCLS .LE. IHDMX) GOTO 60
      PRINT 360,IHDMX
      IHVCLS=IHDMX
  360 FORMAT(2X,*IHVCLS .GT. *,2X,I5)
      GOTO 60
C     TRACK ASSOCIATED-LINK CELLS
   57 LINK=IHVCL(IX)
      VCL(13,JX,ITYPE)=LINK
      IHVCL(IX)=JX
   60 CONTINUE
C     MOVE UP SEGMENT BEGINNING PNTR.
      IVCLP=IVCLC+1
      ELANGP=ELANG
      IF(PR3) PRINT 370 ,IVCLS,IHVCLS,(IHVCL(IX),IX=1,IHVCLS)
  350 FORMAT(2X,5(F10.5))
  300 FORMAT(1X,2I4,13(1X,E8.2))
   320 FORMAT(1X,I2,1X,I3,/,(13F8.2))
  370 FORMAT(2X,20(I5))
  100 RETURN
      END
```

```
              SUBROUTINE PRM                                                  002560
              LOGICAL PR1,PR2,PR3,PR4                                         002570
              COMMON /FLGS/ ITYPE,PR1,PR2,PR3,PR4,ISTOP                       002580
              COMMON /INPUT1/ IDEV1,IDEV2                                     002590
              NAMELIST /PARAM/ PR1,PR2,PR3,PR4,IDEV1,IDEV2,ISTOP              002600
              PRINT 100                                                       002610
        100   FORMAT(1X,*INPUT...PR1,PR2,PR3,PR4,IDEV1,IDEV2,ISTOP*)          002620
              READ(5,PARAM)                                                   002640
              IF(EOF(5))15,3                                                  002650
        3     WRITE(6,PARAM)                                                  002660
              GOTO 20                                                         002670
        15    PRINT 110                                                       002680
        110   FORMAT(1X,*EOF ON UNIT 5*)                                      002690
        20    RETURN                                                          002700
              END                                                             002710
```

FWA OF THE LOAD 111
LWA+1 OF THE LOAD 227071

TRANSFER ADDRESS -- EXTRAD 14574

PROGRAM AND BLOCK ASSIGNMENTS.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER	LEVEL	HARDWARE	COMMENTS
/PARM/	111	64							
EXTRAD	175	14506	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
/INSUB/	14703	24							
/AZM/	14727	720							
/AI024/	15647	6000							
/VALMAX/	23647	13							
/ADATA/	23662	10							
/HEAD/	23672	15							
/LINUM/	23707	1							
/MORED/	23710	5							
/STORE/	23715	7							
/EXPAN/	23724	10							
/ERROR/	23734	1							
/FILTER/	23735	3							
/VELPRM/	23740	1							
/QUANTX/	23741	3							
/PWORK/	23744	22150							
/FIXED/	46114	3413							
/PESTORE/	51527	31676							
/PVSTORE/	103425	30212							
/PSSTORE/	133637	26526							
/REFL/	162365	1272							
BLKDAT.	163657	0	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
/LOOKUP/	163657	172							
INPARM	164051	460	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
/VEL/	164531	2550							
/AZ2/	167301	5							
EXTRAT	167306	1136	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
COMPZ	170444	1555	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
CONTOR	172221	11303	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
PEAKD	203524	4270	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
/MSKVAL/	210014	6							
TOPK	210022	103	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
IPK	210125	104	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
PRANG	210231	60	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
PRN2	210311	362	LGO	05/04/78	FTN	4.6	428	666X I	OPT=2
PAGE	210673	33	UL-ERTLIB	02/16/78	FTN	4.6	428	666X I	OPT=1
LINES	210726	44	UL-ERTLIB	02/16/78	FTN	4.6	428	666X I	OPT=1
DAY	210772	10	UL-ERTLIB	02/16/78	FTN	4.6	428	666X I	OPT=1
ERRX	211002	25	UL-ERTLIB	02/16/78	FTN	4.6	428	666X I	OPT=1
INE	211027	125	UL-ERTLIB	02/16/78	FTN	4.6	428	666X I	OPT=1
/STP.END/	211154	1							
/FCL.C./	211155	23							
/Q8.IO./	211200	133							
Q8NTRY=	211333	0	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FCL INITIALIZATION ROUTINE.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER	LEVEL	HARDWARE	COMMENTS
BUFIN=	211333	46	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BUFFERED INPUT PROCESSOR.
FECMSK=	211401	41	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		INITIALIZE CONSTANTS.
FLTOUT=	211442	311	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON FLOATING OUTPUT CODE
FORSYS=	211753	603	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FORTRAN OBJECT LIBRARY UTILITIES.
INCOM=	212556	276	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON INPUT FORMATTING CODE
INPC=	213054	160	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FORMATTED READ FORTRAN RECORD.
KODER=	213234	456	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		OUTPUT FORMAT INTERPRETER.
NAMOUT=	213712	274	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		NAMELIST OUTPUT ROUTINE.
/IO.BUF./	214206	227							
OUTB=	214435	203	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BINARY WRITE FORTRAN RECORD.
OUTCOM=	214640	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON OUTPUT CODE
REWIND=	215014	37	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		POSITION FILE AT BEGINNING-OF-INFORMATION.
UNIT	215053	50	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		STATUS OF BUFFER I/O FILE.
CLOCK=	215123	31	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		ACCESS SYSTEM CLOCKS FOR FORTRAN.
GOTOER=	215154	14	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTED GO TO ERROR PROCESSOR.
ALOG	215170	73	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTE COMMON AND NATURAL LOGARITHMS. OPT=ALL.
EXP	215263	75	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		EXPONENTIAL FUNCTION. E TO POWER X. OPT=ALL.
ITOJ=	215360	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		INTEGER TO INTEGER EXPONENTIATION.
SINCOS=	215376	66	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TRIGONOMETRIC SINE OR COSINE OF X. OPT=ALL.
SYSAID=	215464	1	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LINK BETWEEN SYS=AID AND INITIALIZATION CODE.
BUFIO=	215465	125	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON SET-UP ROUTINE FOR BUFIN*/BUFOUT*
COMIC=	215612	64	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON CODED I/O ROUTINES AND CONSTANTS.
EOF	215576	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TEST FOR END OF FILE STATUS.
FLTIN=	215714	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON FLOATING INPUT CONVERTER.
FMTAP=	216070	352	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		CRACK APLIST AND FORMAT FOR KODER/KRAKER.
FORUTL=	216442	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FCL MISC. UTILITIES.
GETFIT=	216460	42	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LOCATE AN FIT GIVEN A FILE NAME.
KRAKER=	216522	406	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		PROCESS FORMATTED FORTRAN INPUT.
NAMIN=	217130	523	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		NAMELIST INPUT ROUTINE.
OUTC=	217653	172	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FORMATTED WRITE FORTRAN RECORD.
SQRT	220045	43	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTE THE SQUARE ROOT OF X. OPT=ALL.
SYS=1ST	220110	62	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		MATH LIBRARY LINK TO ERROR MESSAGE PROCESSOR.
XTOY=	220172	7	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		REAL TO REAL EXPONENTIATION.
SBF.SQ	220201	2	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CON.RM/	220203	6							
CIO.RM	220211	40	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/ADB.RM/	220251	10							
MOVE.RM	220261	64	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
MCT.RM	220345	233	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
CHEK.RM	220600	107	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
DSUB.RM	220707	71	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/JMPS.RM/	221000	11							
/OPEN.FO/	221011	7							
OPEN.SQ	221020	254	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OPEX.SQ	221274	14	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/PUT.RT/	221310	11							
FLEQ.RM	221321	42	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSF.FO/	221363	7							
CLSF.SQ	221372	134	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSV.FO/	221526	7							
CLSV.SQ	221535	137	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/REW.FO/	221674	7							
REW.SQ	221703	33	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/TERM.RM/	221736	1							
/GET.FO/	221737	7							

/GET.BT/	221746	5						
/GET.RT/	221753	11						
GET.SQ	221764	1134	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
Z.SQ	223120	101	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
FSU.SQ	223221	106	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
/SKFL.FO/	223327	7						
/SKSF.FO/	223336	1						
SKSF.SQ	223337	50	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
/SKBL.FO/	223407	7						
/SKSB.FO/	223416	1						
SKSB.SQ	223417	101	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
ERR.RM	223520	404	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
CHWR.SQ	224124	7	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
/MEMC.RM/	224133	3						
/OPES.FO/	224136	1						
OPEN.RM	224137	237	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
OPES.SQ	224376	121	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
/PUT.FO/	224517	7						
PUT.SQ	224526	1400	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
WAR.SQ	226126	260	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
CLSF.RM	226406	25	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
GTWR.SQ	226433	41	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
BTPT.SQ	226474	115	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
WEOX.SQ	226611	150	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
SKFL.SQ	226761	51	SL-SYSIO	09/03/76	COMPASS	3.	2-414	
SYS.RM	227032	37	SL-NUCLEUS	04/15/77	COMPASS	3.	2-414	PROCESS SYSTEM REQUEST.

1.348 CP SECONDS 2437003 CM STORAGE USED 129 TABLE MOVES

```
162      0     PROGRAM    EXTRAD                                   VERSION   2.0  (780501)       05/04/78      PAGE   1
---------------------------------------------------------------------------------------------------------------------
PARA
```

```
$INPUT
PRINT1  = F,
PRINT2  = F,
PRINT3  = F,
COPLOT  = T,
ICODES  = -3294061441733848̶50, 3088182601625482 9, 4889622452573 6813,          6691062303521 8797, 8492502154470 0781, 1029394 2005 4182765
,
          1209533185636647 49, 1389682170731467 33, 1569826155826 28717,          1749970140921 10701, 1930114126015 92685,
          2110258111110746 69, 2290402096205566 53, 2470546081300 38637,          2650690066395 20E21, 2830834051490 02605,
          3010978036584845 89, 3191122021679665 73, 3371266006774 48557,          3551409991869 30541, 3731553976964 12525,
          3911697962058945 09, 4091841947153764 93, 4271985932248 58477,          4452129917343 40461, 4632273902438 22445,
          4812417887533044 29, 5172705857722683 97, 5352849842817 59381,          5532993827912 32365, 5713137813007 14349,
          -5635933247966506 42, -5455789262571686 33, -5275645277776 86674,       -5095501292682 04690, -4915357307587 22706,
A1      = .443E+00,
B1      = .56E+00,
A2      = .86E+00,
B2      = .186E+02,
CONTRZ  = T,
CONTRV  = T,
CONTRS  = T,
NFILE   = 0,
NUMF    = 30,
AC      = -.10776555E+03, .19767838E+01, -.94297523E-01, .18226318E-03,
CALM    = .332E+00,
CALB    = -.983E+02,
XCUT    = .1E+02,
CK      = .1E+02,
ZMAX    = 0.0,
VMAX    = 0.0,
NREC    = 1,
NUMR    = 99999,
IRUN    = 0,
INC     = 0,
TI      = -9A  LA,
```

```
TOW     = 0.0,
DN      = 0.0,
STARTR  = .2E+02,
STOPR   = .15E+03,
INPRF   = 794,
SCALE   = .1E+01,
AE      = .121E+01,
AA      = .4E+03,
BB      = .14E+01,
X1      = 0.0,
X2      = .8E+01,
Y1      = 0.0,
Y2      = .8E+01,
TV      = 35,
TSV     = 1000000,
LDV     = 3,
LTV     = 3,
LSV     = 3,
ICOMP   = 6,
VMIN    = 0.0,
SVMIN   = 0.0,
AREANN  = .1E+01,
WAVEL   = .542E-01,
VQUANT  = .1E+02,
SQUANT  = .6E+01,
RQUANT  = .1E+01,
VOLTAP  = T,
DAZM    = .1E+01,
ESTART  = .15E+01,
DELT    = .5E+00,
$END
```

```
162    8    PROGRAM    EXTRAD                                   VERSION   2.0  (780501)      05/04/78      PAGE  2
EXEC
        NO OF RECORDS/RADIAL  4      CELL WIDTH  937.2  METERS      PRF   794.0
```

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	116.2

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	1.27	26.1	12.6	-15.7	20.1	3.3	1.22	.96	-4
2	20	1.85	32.3	15.8	-19.3	27.7	4.1	4.72	2.56	2
3	20	2.34	35.9	14.6	-18.3	23.9	6.0	10.48	4.49	5
4	20	1.85	29.6	22.3	-33.1	39.9	2.8	3.06	1.66	6
5	20	3.85	21.0	-36.7	-47.8	60.5	3.3	1.69	.44	10
6	20	8.68	21.6	-37.9	-53.7	65.7	8.1	4.22	.49	9
7	20	3.30	36.0	-18.4	-13.7	23.0	8.8	13.00	3.93	11
8	20	3.41	38.3	-18.8	-9.7	21.1	9.9	5.86	1.72	-12
9	20	14.93	25.5	-132.1	-67.3	148.5	6.1	13.15	.88	-13
10	20	6.48	29.4	-36.7	-3.5	36.9	10.8	9.68	1.49	26
11	20	8.14	34.0	-35.1	-10.3	36.6	13.6	26.21	3.22	19
12	20	1.40	21.0	-84.5	-26.5	88.5	1.8	.61	.44	21
13	20	926.20	36.0	-127.6	-44.5	135.1	419.8	3540.07	3.82	-18
14	20	2.89	30.6	-37.0	.5	37.0	4.8	5.26	1.82	29
15	20	2.15	21.0	-147.8	-22.5	149.5	.9	.94	.44	-27
16	20	325.32	24.8	-67.3	11.5	68.3	292.8	259.34	.79	34
17	20	25.33	25.1	-132.3	6.7	132.4	11.7	23.86	.94	31
18	20	397.33	41.7	-25.4	22.1	33.7	721.8	4351.85	10.95	36
19	20	10.10	41.0	-33.3	8.4	34.4	16.0	94.26	9.34	35
20	20	2.08	21.0	-54.5	11.7	55.8	2.3	.91	.44	37
21	20	9.11	24.7	-102.7	24.5	105.6	5.3	7.04	.77	38
22	20	2.29	21.0	-126.7	31.5	132.6	1.1	1.00	.44	39
23	20	2.50	21.0	-140.6	34.7	144.8	1.1	1.09	.44	40
24	20	3.53	21.0	-124.7	34.2	129.3	1.7	1.55	.44	41
25	20	9.42	22.7	-136.6	40.1	142.4	4.0	5.44	.58	42
26	20	2.80	24.0	-133.4	39.3	139.2	1.2	2.01	.72	43
27	20	1.49	21.0	-63.8	26.0	68.9	1.3	.65	.44	44
28	20	1.06	37.6	-26.6	12.3	29.5	2.2	6.39	6.02	45
29	20	4.30	21.5	-114.1	96.5	149.5	1.8	2.03	.47	-46
30	20	2.24	22.0	-83.2	73.5	111.1	1.2	1.15	.52	47
31	20	2.09	27.4	-51.3	51.4	72.6	1.8	2.61	1.25	48
32	20	4.19	21.0	-76.4	76.3	108.0	2.6	1.84	.44	49
33	20	4.28	21.0	-84.1	123.0	149.0	1.8	1.88	.44	-51
34	20	1.04	24.0	-32.6	50.3	60.4	1.1	.75	.72	52
35	20	31.27	24.2	-75.1	126.8	146.7	13.0	22.54	.72	-53
36	20	8.94	22.0	-43.2	78.3	90.0	6.1	4.55	.51	54
37	20	9.05	23.2	-49.1	88.8	101.5	5.4	5.63	.62	55
38	20	1.66	22.0	-45.8	84.4	96.1	1.1	.86	.52	56
39	20	118.95	29.7	-34.0	89.1	95.4	76.3	185.96	1.56	57
40	20	2.51	21.5	-36.2	79.3	87.2	1.5	1.20	.48	58
41	20	34.65	32.4	-27.4	70.7	75.8	28.0	88.01	2.54	59
42	20	1.33	21.8	-7.2	18.9	20.1	4.0	.66	.50	-60
43	20	1.52	21.6	-24.3	92.3	96.1	1.0	.67	.44	61
44	20	77.46	25.0	-4.7	38.0	38.3	123.9	63.75	.32	62
45	20	1.30	21.5	-3.2	19.9	20.1	4.0	.62	.48	-63
46	20	14.45	21.7	-9.0	62.3	63.4	13.9	7.03	.49	64
47	20	8.95	23.4	-16.2	93.0	94.4	5.8	5.78	.65	65
48	20	5.75	22.1	-14.5	89.3	91.0	3.9	3.01	.52	66
49	20	3.97	21.8	-3.3	62.7	62.8	3.9	1.97	.50	67
50	20	1.55	29.5	-.5	23.2	23.2	4.1	2.75	1.77	68
51	20	2.98	21.6	3.8	22.5	22.8	8.0	1.45	.49	70

52	20	2.35	22.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.51	[illegible]
53	20	7.26	24.4	12.2	39.0	40.9	10.3	5.43	.75	73
54	20	4.47	22.1	17.3	54.7	57.6	4.7	2.33	.52	74
55	20	12.50	21.7	39.7	71.3	82.1	9.3	6.10	.49	81
56	20	1.59	21.8	38.3	90.1	97.9	1.1	.74	.44	76
57	20	11.62	22.0	37.2	64.3	74.8	9.5	5.95	.51	82
58	20	241.59	23.2	49.1	97.4	109.1	135.4	149.88	.62	78
59	20	1.12	21.0	44.8	64.2	78.3	.9	.49	.44	83
60	20	2.79	21.8	52.1	71.1	88.2	1.9	1.22	.44	84
61	20	590.31	32.3	59.5	63.7	87.2	413.8	1315.98	2.23	85
62	20	1.12	26.6	17.7	12.3	21.9	3.1	1.20	1.07	95
63	20	4.59	22.0	88.8	114.3	145.3	1.9	2.37	.52	87
64	20	1.27	28.5	17.3	19.4	20.1	3.9	1.83	1.44	-96
65	20	85.83	29.1	100.4	109.1	147.5	35.6	125.63	1.46	-90
66	20	3.38	33.8	36.1	-6.3	36.8	6.3	10.53	2.77	99
1	40	13.52	43.1	-124.7	-49.5	134.2	6.2			18
2	40	13.01	41.7	-101.3	-36.3	107.8	7.4			18
3	40	3.99	41.5	-130.0	-48.3	138.6	1.8			18
4	40	33.70	47.2	-134.3	-45.4	142.1	13.2			18
5	40	2.19	41.0	-133.2	-36.3	138.2	1.0			18
6	40	2.11	42.0	-142.0	-36.7	146.7	.9			18
7	40	2.59	46.1	-33.2	8.9	34.4	4.6			35
8	40	184.75	46.3	-27.5	20.4	34.3	186.7			36
9	40	33.51	43.0	-15.5	28.5	32.6	62.9			36
10	40	15.50	42.9	55.3	60.7	82.1	12.5			85

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
1	22.0	67.3	0.0	0.0	112.4	-.44409E-15
2	27.1	9200.0	12.6	-10.1	60.3	.57497E+00
3	35.0	671779.4	5.1	-10.1	61.0	.39223E+01
4	31.0	219615.2	-38.6	26.4	76.6	.21589E-01
5	23.4	21603.5	-5.0	-8.5	69.9	.80601E+01
6	28.1	75385.5	-7.1	-7.9	91.0	.54502E+00

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	32.5	4.0	-110.5	-44.6	119.5	2.0	1.93	-.27	.06	-4.64	18
2	44.0	6.3	-124.3	-48.8	133.6	3.2	2.45	-.21	.20	-3.13	18
3	51.5	4.5	-135.2	-47.9	143.4	1.9	1.94	-.27	-1.35	-4.10	18
4	41.6	13.0	-101.3	-36.8	107.7	7.4	1.60	-.32	.09	-3.46	18
5	48.0	2.4	-131.9	-44.3	139.2	1.1	1.83	-.64	.20	-4.50	18
6	37.6	1.8	-35.1	-11.8	37.0	3.0	1.34	.14	0.00	0.00	19
7	40.0	8.3	-132.6	-35.6	137.3	3.7	2.07	.38	.51	-1.78	18
8	41.0	4.2	-142.4	-36.9	147.1	1.8	1.58	.16	.45	.35	18
9	37.0	5.5	-139.3	-34.5	143.5	2.8	1.90	.34	.28	-.41	18
10	33.5	5.0	-143.2	-29.6	146.2	2.1	.92	-.64	-.05	-2.35	18
11	30.1	14.6	-129.4	-23.7	131.5	6.8	1.81	.01	.13	-3.17	18
12	25.0	2.1	-134.5	2.5	134.5	1.0	0.00	1.92	0.00	0.00	31
13	32.9	2.7	-132.4	6.9	132.6	1.2	.50	.11	0.00	-2.30	31
14	27.0	3.6	-102.6	24.4	105.4	2.1	.33	-.37	.90	-2.50	36
15	27.5	35.1	-65.1	14.6	69.6	31.7	1.20	-.15	-.02	-3.45	34
16	22.6	9.4	-136.7	40.0	142.4	4.0	.75	.02	.55	-1.15	42
17	24.0	2.8	-133.4	39.8	139.2	1.2	.17	0.00	0.00	-.50	43
18	49.5	1.6	-35.6	13.2	38.0	2.5	2.20	-1.02	.45	-3.69	36
19	48.0	1.3	-34.4	15.4	37.7	3.2	1.54	.44	-.14	-2.79	36
20	49.6	9.8	-26.0	20.0	33.5	17.8	1.74	-.95	-.13	-.26	36
21	27.4	2.1	-51.3	51.4	72.6	1.8	.49	0.00	0.00	0.00	48
22	50.0	1.7	-23.2	25.6	34.5	3.1	1.50	-1.81	-.22	-3.43	36
23	27.0	6.3	-74.2	125.5	145.7	2.9	.61	.39	-.07	-9.03	53
24	24.5	3.7	-49.4	88.9	101.7	2.2	.08	0.00	-.19	-9.73	55
25	24.0	1.4	-39.5	79.3	88.6	1.0	.67	0.00	-.20	-9.80	54
26	46.0	1.6	-12.3	30.6	33.0	3.0	.78	-.64	-.17	-9.92	36
27	38.0	2.4	-28.0	70.6	75.3	1.3	.92	.16	-.40	-10.25	55
28	38.4	4.8	-32.9	88.9	94.8	3.1	1.21	-.63	.04	-10.16	57
29	29.5	1.1	-8.7	32.1	33.3	1.9	1.08	-.27	0.00	-11.40	36
30	25.5	2.4	-10.1	36.6	38.0	3.9	.75	-.16	-.10	-12.13	36
31	24.3	5.0	-16.3	93.0	94.4	3.3	.38	.08	.03	-11.57	65
32	22.0	5.7	-14.5	89.8	90.9	3.9	.29	-.32	.12	-11.35	66
33	28.3	9.4	-5.6	40.3	40.7	14.2	1.05	.05	-.10	-12.74	62
34	25.9	6.0	-4.5	40.2	40.5	9.1	1.37	.02	-.05	-12.23	62
35	28.0	1.1	13.4	39.5	41.7	1.7	1.65	-.51	-1.31	-15.13	73
36	25.5	13.4	49.0	106.2	116.9	7.2	.68	.13	-.00	-6.93	78
37	26.8	7.3	43.7	87.4	97.7	4.6	1.35	.31	-.10	-6.61	78
38	24.8	6.3	47.8	91.8	103.5	3.7	1.35	-.22	.12	-7.23	76
39	21.6	12.5	39.7	71.8	82.1	9.3	1.61	1.60	.65	1.21	81
40	25.8	22.4	54.7	97.0	111.4	12.3	1.26	-.04	-.01	-7.06	78
41	21.9	11.6	37.2	64.9	74.8	9.5	1.13	3.43	-.36	1.42	82
42	37.0	1.1	48.7	56.4	74.5	.9	1.67	-.53	-1.00	2.40	85
43	37.5	6.9	45.1	53.7	70.2	6.0	1.67	5.12	.97	-6.13	85
44	43.8	7.7	54.5	60.4	81.3	5.8	2.19	-1.49	.23	-2.70	65
45	38.0	2.3	101.9	106.7	147.6	1.0	2.83	-.11	-.30	-11.70	90
46	25.5	3.9	88.5	86.4	123.7	1.9	1.83	-.74	-.30	-9.15	85
47	39.5	6.3	71.3	68.5	98.9	3.9	2.79	1.09	.60	-7.37	85
48	22.9	29.7	97.0	93.0	134.4	13.5	1.56	-.55	.44	-11.67	85

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	.7	2.3	-132.0	-57.1	143.3	1.0	1.0	.7	18
2	1.6	2.1	-125.2	-51.6	135.4	1.0	2.3	1.6	18
3	1.8	4.4	-126.9	-53.6	137.7	1.9	2.4	-1.8	18
4	1.5	1.9	-111.3	-45.9	120.4	1.0	1.8	1.5	18
5	1.8	6.8	-129.5	-53.4	140.1	3.0	2.7	.5	18
6	2.6	1.6	-101.5	-37.7	108.2	.9	1.3	-2.6	18
7	2.7	1.6	-105.8	-39.0	112.0	.9	2.0	-2.7	18
8	2.4	3.3	-107.2	-39.9	114.4	1.8	2.0	-.1	18
9	1.0	3.5	-117.7	-43.8	125.5	1.8	.5	1.0	18
10	.5	9.4	-97.6	-35.4	103.3	5.5	1.2	.5	18
11	2.0	2.2	-132.9	-47.1	141.0	1.0	1.8	2.0	18
12	1.2	4.7	-128.0	-42.9	135.0	2.1	1.5	1.2	18
13	1.5	1.7	-102.3	-32.3	107.3	1.0	1.2	1.5	18
14	.5	1.6	-95.2	-30.0	99.3	1.0	2.3	.5	18
15	1.9	2.2	-134.5	-42.4	141.0	1.0	3.2	1.9	18
16	2.2	1.8	-100.2	-29.7	104.5	1.1	0.0	2.2	18
17	1.1	2.3	-129.8	-38.5	135.4	1.1	2.3	-1.1	18
18	1.3	4.4	-134.6	-37.3	139.7	1.9	2.5	1.3	18
19	1.9	1.5	-90.8	-25.1	94.2	1.0	0.8	1.9	18
20	1.1	2.1	-139.3	-36.0	143.3	.9	1.7	1.1	18
21	.8	2.3	-142.2	-31.9	145.7	1.0	2.7	-.8	18
22	.3	11.7	-137.4	-29.1	140.5	5.1	1.5	.3	18
23	.8	2.0	-124.8	-23.4	127.0	1.0	1.5	.8	18
24	.9	4.6	-143.7	-27.0	146.2	1.9	0.0	.9	18
25	.5	7.8	-131.4	-20.6	133.0	3.6	2.5	.5	18
26	.9	2.2	-128.6	-17.7	129.8	1.1	0.0	.9	18
27	.9	2.2	-125.8	-17.3	127.0	1.1	0.0	.9	18
28	.5	4.0	-66.1	3.4	66.2	3.7	1.7	.5	34
29	1.0	6.2	-131.4	9.7	131.7	2.9	0.0	1.0	31
30	.4	3.1	-69.2	5.4	69.4	2.7	1.4	.2	34
31	.3	3.4	-60.4	5.4	60.5	3.4	1.7	-.2	34
32	.4	6.7	-67.5	8.8	68.0	6.0	1.4	-.3	34
33	.8	1.0	-57.3	10.0	58.2	1.1	1.5	.8	34
34	.3	2.0	-75.4	13.2	76.5	1.6	1.3	.3	34
35	.3	3.2	-68.9	12.6	70.1	2.8	1.1	-.2	34
36	.9	1.0	-57.8	14.3	59.5	1.1	1.7	.9	34
37	1.8	1.8	-102.4	25.3	105.4	1.1	.7	1.8	38
38	.3	12.3	-67.4	18.0	69.8	10.7	1.3	-.3	34
39	.9	5.7	-136.5	40.7	142.4	2.5	0.0	.9	42
40	.6	2.0	-76.2	76.9	108.2	1.1	.3	-.6	49
41	.3	4.7	-76.5	127.7	148.8	1.9	.3	-.3	53
42	1.1	1.1	-17.2	29.0	33.7	1.9	.4	-1.1	36
43	.2	7.7	-72.4	126.0	145.3	3.3	.7	-.2	53
44	.4	3.5	-48.3	89.8	101.2	2.1	.5	-.4	55
45	.5	2.7	-19.5	37.6	42.3	3.9	.8	-.5	36
46	.6	2.4	-27.6	69.7	75.0	1.9	1.1	-.6	59
47	.7	1.6	-32.9	87.2	93.2	1.1	.8	.7	57
48	.5	1.5	-38.1	89.2	94.2	1.0	.8	-.5	57
49	.2	7.3	-23.7	72.8	76.5	5.8	1.5	-.2	59
50	.5	1.4	-13.7	89.4	90.4	1.8	0.8	.5	66

51	.4	1.0	-7.6	64.7	65.1	1.0	1.0	-.4	64
52	.6	1.4	-.4	41.2	41.2	2.1	.8	-.6	62
53	.8	2.1	.1	34.8	34.9	3.7	1.7	-.8	62
54	2.4	1.7	39.0	91.9	99.8	1.1	0.0	-2.4	78
55	1.6	1.8	39.8	93.6	101.7	1.1	.5	-1.6	78
56	.9	1.5	42.3	94.5	103.6	.9	1.3	-.9	78
57	1.5	1.6	46.1	103.1	112.9	.9	.5	-1.5	78
58	.8	3.4	48.6	95.1	106.3	1.9	1.0	-.8	78
59	.8	1.4	47.4	88.9	100.7	.9	1.3	-.8	78
60	.9	1.7	56.6	106.3	120.4	.9	.7	-.9	78
61	.9	3.6	54.6	104.7	118.1	1.8	1.0	-.9	78
62	2.1	2.9	44.6	85.6	96.5	1.8	1.3	-2.1	78
63	3.1	1.4	39.6	71.8	82.3	1.1	1.5	3.1	81
64	1.1	2.1	53.1	92.1	106.4	1.2	.2	-1.1	78
65	2.7	1.3	56.6	93.4	109.2	.7	0.0	-2.7	78
66	2.5	1.3	57.5	95.0	111.1	.7	0.0	-2.5	78
67	3.3	1.1	40.1	50.1	64.2	1.1	2.7	-3.3	85
68	3.6	1.3	46.0	57.4	73.5	1.1	1.7	3.6	85
69	2.9	1.1	38.9	48.7	62.5	1.1	0.0	2.9	85
70	2.8	1.4	52.4	63.1	82.0	1.1	2.7	-2.8	85
71	3.4	1.3	48.2	58.0	75.4	1.1	1.7	-3.4	85
72	3.9	1.0	45.6	52.9	69.3	.9	2.0	-3.9	85
73	1.2	1.6	55.8	62.7	83.3	1.1	1.3	-1.2	85
74	.7	5.4	96.5	108.5	145.2	2.3	1.8	-.7	90
75	.9	2.7	64.3	69.4	94.5	1.8	2.5	-.9	85
76	4.4	1.0	48.1	51.9	70.9	.9	0.0	4.4	85
77	1.2	2.9	68.1	73.6	100.3	1.8	1.5	-1.2	85
78	1.2	1.1	50.6	54.7	74.5	.9	2.2	1.2	85
79	1.0	1.5	69.7	75.3	102.5	.9	1.0	-1.0	85
80	3.5	1.3	56.6	59.3	82.0	1.0	2.3	3.5	85
81	.5	6.7	61.5	65.6	90.3	4.6	1.2	-.5	85
82	3.1	1.3	55.0	55.7	78.3	1.1	0.0	-3.1	85
83	2.8	1.3	53.7	54.3	76.4	1.1	1.0	-2.8	85
84	1.1	3.2	67.6	69.5	97.0	2.0	2.8	-1.1	85
85	2.9	1.3	60.7	59.2	84.5	1.0	1.0	-2.9	85
86	1.1	1.7	76.1	74.3	106.4	1.0	2.5	1.1	85
87	1.1	5.6	84.9	82.0	118.5	2.9	.9	-1.1	85
88	1.8	1.4	63.7	60.1	87.5	1.0	.8	-1.8	85
89	1.5	1.5	67.8	64.0	93.2	1.0	0.0	-1.5	85
90	1.8	4.0	92.0	86.8	126.5	1.9	0.0	-1.8	85
91	1.9	2.0	93.7	88.4	128.3	1.0	0.0	-1.9	85
92	1.7	2.1	96.5	91.0	132.6	1.0	0.0	1.7	85
93	1.7	2.2	99.2	93.6	136.4	1.0	1.0	1.7	85
94	2.8	1.6	75.8	69.1	102.6	1.0	2.3	-2.8	85
95	2.3	1.6	73.1	66.6	98.3	1.0	1.0	-2.3	85

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1933	40	1.2	118.2	118.2

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	1.2	1.6	14.1	-19.3	23.9	4.0	5
2	.7	1.5	-36.1	-51.4	62.8	1.6	9
3	.9	2.8	-38.5	-53.7	66.0	2.5	9
4	1.3	2.5	-131.9	-68.2	148.5	1.1	13
5	2.2	1.9	-122.4	-57.9	135.4	.9	18
6	1.5	4.5	-117.7	-53.5	129.3	2.1	18
7	2.9	8.9	-129.0	-55.8	140.5	3.9	18
8	1.8	2.0	-115.7	-50.0	126.0	1.0	18
9	2.2	1.8	-103.5	-42.7	112.0	1.0	18
10	1.3	1.5	-39.1	-38.6	105.4	1.1	18
11	2.8	9.3	-131.6	-51.1	141.2	4.0	18
12	2.8	3.3	-108.0	-48.2	115.3	1.8	18
13	2.4	13.9	-112.8	-43.7	121.0	7.0	18
14	2.1	14.5	-95.8	-30.8	100.6	8.8	18
15	3.1	6.6	-133.6	-42.1	140.1	2.9	18
16	2.3	17.5	-101.7	-34.5	107.4	10.0	18
17	2.8	21.6	-136.8	-45.9	144.3	9.1	18
18	1.8	1.8	-34.7	-10.7	36.4	3.0	19
19	2.7	4.6	-139.1	-38.5	144.3	1.9	18
20	1.6	7.5	-123.7	-31.5	127.6	3.6	18
21	2.6	19.2	-132.4	-30.7	135.9	8.6	18
22	2.5	15.2	-141.0	-32.3	144.6	6.9	18
23	2.7	5.7	-130.2	-19.9	131.7	2.6	18
24	1.9	1.9	-37.0	-2.6	37.1	3.1	25
25	2.2	6.3	-133.1	4.0	133.2	2.9	31
26	1.3	2.5	-130.6	6.8	130.7	1.2	31
27	1.7	4.7	-67.1	8.1	67.6	4.2	34
28	1.7	2.1	-54.5	11.7	55.8	2.3	37
29	.6	5.5	-103.1	24.9	106.0	3.2	38
30	1.5	4.8	-74.8	19.3	77.2	3.8	34
31	.8	1.7	-124.0	35.1	128.9	.8	41
32	1.9	3.7	-137.1	38.8	142.5	1.6	42
33	2.7	1.1	-37.2	13.0	39.4	1.7	36
34	1.4	5.5	-69.3	24.7	73.5	4.7	34
35	1.1	1.1	-26.7	12.6	29.5	2.2	45
36	1.9	6.9	-33.6	17.1	37.7	11.2	36
37	2.5	3.5	-30.6	20.5	37.0	5.8	36
38	1.2	2.2	-83.2	73.6	111.1	1.2	47
39	1.1	2.2	-76.7	75.7	107.7	1.2	49
40	.7	1.4	-51.1	51.6	72.6	1.1	48
41	2.3	1.3	-21.9	25.7	33.8	2.3	36
42	2.0	2.6	-18.7	24.8	31.0	5.2	36
43	2.2	7.0	-76.8	125.0	146.7	2.9	53
44	1.6	3.0	-15.5	25.4	29.8	6.2	35
45	1.0	1.7	-46.0	88.6	100.7	1.1	55
46	.7	1.4	-39.5	79.3	88.6	1.0	54
47	.7	1.2	-36.0	78.9	86.7	.9	58
48	2.0	3.3	-12.1	27.4	29.9	6.8	36
49	1.2	2.6	-30.5	71.1	77.3	2.0	59
50	1.8	3.1	-35.0	65.9	92.8	2.0	57
51	1.7	7.5	-31.5	82.8	88.6	5.2	57

52	1.4	7.4	-24.0	63.2	67.6	6.7	60
53	1.6	4.5	-9.9	30.3	31.9	8.7	36
54	1.7	9.7	-24.4	73.1	77.0	7.7	59
55	1.7	1.0	-8.1	30.8	31.8	1.9	36
56	.6	2.9	-14.5	90.2	91.4	1.9	66
57	2.2	1.5	-14.3	93.1	94.2	1.0	65
58	1.8	1.0	-7.6	64.7	65.1	1.0	64
59	1.3	6.4	-8.5	62.6	63.2	8.1	64
60	1.3	2.0	-3.4	63.2	63.3	1.9	67
61	1.7	1.2	-.4	23.6	23.6	3.1	68
62	2.0	1.1	.3	25.7	25.7	2.7	69
63	1.9	3.0	3.8	22.5	22.8	6.0	70
64	2.4	1.8	12.1	38.7	40.5	2.7	73
65	.9	4.5	17.7	54.8	57.5	4.7	74
66	.7	1.4	37.6	92.4	99.8	.9	78
67	.9	1.7	36.3	90.1	97.9	1.1	76
68	1.7	5.9	44.5	104.7	113.8	3.2	78
69	1.8	1.4	38.8	86.8	95.1	.9	78
70	1.7	1.7	48.8	109.1	119.5	.9	78
71	1.8	3.4	52.1	106.0	118.1	1.6	78
72	1.5	5.6	49.2	104.5	115.5	4.6	78
73	1.9	7.8	45.0	88.0	98.9	4.8	78
74	2.2	3.0	48.4	91.0	103.1	1.8	78
75	2.3	3.1	40.9	72.2	82.9	2.3	81
76	1.7	25.3	52.9	98.2	111.5	13.9	78
77	1.7	3.3	38.5	65.1	75.7	2.6	82
78	1.0	1.1	44.8	64.2	78.3	.9	83
79	1.0	2.8	52.2	71.0	88.1	1.9	84
80	3.0	1.1	42.1	54.5	68.9	1.0	85
81	3.0	2.1	40.1	50.8	64.7	2.0	85
82	2.9	12.7	96.1	111.4	147.1	5.3	90
83	2.6	12.4	51.2	62.0	80.5	9.4	85
84	1.9	3.9	68.5	77.0	103.1	2.3	85
85	2.7	2.6	57.6	60.3	83.4	1.9	85
86	2.5	2.3	100.0	104.7	144.8	1.0	90
87	2.4	12.6	85.7	86.7	121.9	6.3	85
88	2.8	4.9	73.4	71.7	102.6	2.9	85
89	2.9	8.4	94.6	92.3	132.1	3.9	85
90	2.5	2.0	90.9	88.7	127.0	1.0	85
91	2.5	2.0	92.2	90.0	126.9	1.0	85

TOTAL IDD= 101 15 29 28

EOF READ ON UNIT 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

TOTAL IDD= 1 1 1 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	6.1	160.1	111.0

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	17.32	21.4	-31.0	-50.1	59.0	18.0			1
2	20	2.94	21.0	-34.6	-45.0	56.8	3.2			3
3	20	1.10	21.0	-50.7	6.0	51.1	1.3			4
4	20	542.48	43.0	-25.8	21.2	33.3	1005.8			7
5	20	31.69	22.1	1.6	22.3	22.3	86.8			-1(
6	20	1.16	21.0	-3.5	66.3	67.0	1.1			15
7	20	12.57	21.1	-6.9	67.0	67.4	11.4			12
8	20	1.47	21.5	-4.1	42.4	42.6	2.1			13
9	20	11.22	21.1	-1.9	64.0	64.0	10.7			14
10	20	15.17	21.9	6.1	47.4	47.8	20.7			17
11	20	1.50	21.5	6.4	25.1	25.9	3.5			18
12	20	2.61	21.3	10.2	20.3	22.7	7.0			20
13	20	11.93	22.9	22.0	43.5	48.9	14.9			21
14	20	2.19	21.8	14.5	21.9	26.2	5.1			23
15	20	111.17	28.3	70.4	67.9	97.8	69.5			27
16	20	20.35	22.3	65.4	76.7	100.3	12.4			28
17	20	341.36	34.3	44.9	53.3	70.1	297.8			26
18	20	1.05	21.0	22.2	20.9	30.5	2.1			33
19	20	15.07	22.7	34.9	38.5	52.1	17.7			30
20	20	2.13	22.0	98.8	91.2	134.5	1.0			34
21	20	87.00	26.6	73.9	78.3	108.0	49.2			32
1	40	148.21	45.1	-27.0	20.1	33.6	269.5			7
2	40	11.12	46.0	-10.9	31.4	33.2	20.4			7
3	40	9.74	45.8	41.0	50.1	64.8	9.2			28

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	6.1	160.1	111.0

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
4	22.0	78.7	0.0	0.0	.1	-.88818E-15
5	21.5	209.2	-2.7	-7.1	4.8	.76765E-01
7	21.6	1151.1	0.0	1.6	.3	-.35527E-14
9	33.3	258537.7	6.4	0.0	11.2	-.35527E-14

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	6.1	160.1	111.0

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	21.4	16.4	-31.1	-50.2	59.0	16.9	1.41	-.09	-.76	-2.13	1
2	53.9	4.9	-32.9	16.0	36.6	5.3	2.15	-1.65	-.03	-.29	7
3	33.0	2.8	-35.4	22.9	42.2	4.0	1.20	.02	-.45	-2.23	7
4	32.3	2.3	-32.6	24.0	40.4	3.5	1.12	-.42	-.13	-3.56	7
5	54.5	3.6	-25.2	21.7	33.3	6.7	2.01	1.74	-.03	2.33	7
6	52.0	2.0	-19.5	24.0	30.9	3.9	1.59	-2.02	2.29	.50	7
7	50.0	1.9	-16.2	21.8	27.2	4.3	1.05	-.58	-.40	.29	7
8	49.0	1.6	-10.3	31.6	33.3	3.0	1.94	-6.07	-.49	-7.89	7
9	22.8	2.2	3.3	47.9	48.0	2.8	.95	-.27	-.26	-4.00	17
10	21.4	1.5	6.4	25.2	26.0	3.5	.78	-.06	-.12	-5.73	16
11	22.5	18.9	2.1	22.5	22.6	51.0	1.11	-.37	-.33	-3.12	10
12	23.7	5.6	21.9	43.5	48.7	7.0	.92	-.08	.00	1.38	21
13	21.7	2.2	14.4	21.9	26.3	5.1	.88	0.00	-.11	2.13	23
14	49.1	1.8	40.3	50.0	64.2	1.8	2.59	1.01	-.28	2.77	26
15	39.0	2.8	52.6	62.3	81.5	2.1	2.67	-1.61	1.05	6.99	26
16	24.9	6.8	60.6	70.4	92.9	4.5	2.04	-.57	-.75	5.83	27
17	23.6	5.7	66.0	74.3	99.3	3.5	1.55	2.14	-.81	6.47	28
18	23.6	8.3	34.5	38.2	51.5	9.8	.77	.00	-.10	-.76	30
19	33.8	6.3	48.5	51.3	70.6	5.4	2.20	.31	.78	.53	26
20	31.3	7.6	75.4	77.4	105.1	4.4	2.71	1.49	.59	2.30	32
21	32.7	9.9	58.3	56.8	81.4	7.5	1.20	.04	-.31	.32	26
22	35.8	8.3	70.6	68.2	95.1	5.2	2.94	.41	.67	6.18	27

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	38	5.1	168.1	111.0

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	3.2	1.5	-31.1	-48.8	57.2	1.6	2.1	-3.2	1
2	1.4	1.0	-25.5	25.5	36.1	1.8	1.1	-1.4	7
3	.9	2.5	-15.5	36.7	39.9	3.9	.9	-.9	7
4	.5	1.4	-10.9	26.2	28.3	3.0	.8	-.5	7
5	1.9	2.1	-12.2	30.7	33.0	4.0	1.2	-.9	7
6	.7	1.8	-9.4	26.5	28.2	3.9	.7	-.7	7
7	1.1	1.3	-12.8	39.2	41.2	1.9	1.2	-1.1	7
8	.6	1.5	-6.2	28.3	29.0	3.1	1.1	-.6	7
9	1.7	1.2	-6.5	36.9	37.5	1.9	1.5	-1.7	7
10	1.7	1.8	-4.6	37.7	38.0	2.9	1.3	-1.7	7
11	.4	1.2	-6.1	69.6	69.9	1.1	1.0	-.4	12
12	.2	2.3	-6.2	66.7	67.0	2.1	1.4	-.2	12
13	.8	1.2	-1.2	63.2	63.3	1.1	.7	-.8	14
14	.4	3.2	-.8	64.8	64.9	3.0	1.0	-.4	14
15	.9	1.1	1.2	22.9	22.9	3.0	1.2	-.9	10
16	.8	1.1	2.4	22.3	22.4	3.0	1.3	-.8	10
17	.3	1.7	4.7	24.0	24.5	4.2	1.0	-.3	10
18	1.5	1.1	48.7	65.9	62.0	.6	1.6	-1.5	26
19	.9	1.2	39.4	51.6	65.1	1.1	2.3	.9	26
20	3.2	1.1	50.9	64.3	82.0	.8	2.3	3.2	26
21	3.4	1.1	42.6	50.5	66.1	1.1	2.2	-3.4	26
22	1.6	1.8	66.2	78.4	102.6	1.1	2.7	1.6	26
23	3.5	1.1	65.2	74.4	98.3	.7	.8	-3.5	28
24	2.3	1.8	52.5	59.9	79.7	1.4	2.5	.1	26
25	3.0	1.2	70.7	80.7	107.3	.7	1.8	-3.0	32
26	2.6	1.9	72.9	81.2	109.2	1.1	3.0	2.6	32
27	1.7	3.0	48.9	55.2	73.7	2.5	2.2	-1.7	26
28	1.2	1.5	56.7	63.1	84.9	1.1	2.3	1.2	26
29	3.0	1.6	62.3	69.4	93.2	1.1	2.2	-3.0	27
30	2.5	1.9	77.0	82.6	112.9	1.1	3.0	-2.5	32
31	1.0	2.8	56.2	60.3	82.4	2.1	2.1	-1.0	26
32	1.4	1.4	53.1	54.9	76.4	1.1	2.0	-1.4	26
33	.9	1.8	66.1	68.4	95.1	1.1	2.8	-.9	27
34	.8	3.8	57.6	57.2	81.1	2.9	1.1	-.8	26
35	.9	1.3	60.2	59.8	84.9	1.0	1.5	-.9	26
36	1.8	3.7	76.5	74.6	106.9	2.1	1.1	-1.8	32
37	.9	1.3	61.6	56.9	83.9	1.0	1.6	-.9	26
38	1.9	1.6	73.3	67.7	99.9	1.0	2.9	-1.9	27
39	.3	5.1	59.7	54.8	81.1	3.9	1.4	.3	26
40	3.1	1.5	73.1	65.2	97.9	1.0	2.6	3.1	27
41	.8	1.6	77.0	66.4	101.7	1.0	2.7	-.6	27
42	.7	1.6	76.7	63.9	99.9	1.0	2.2	.7	27

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VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1934	36	6.1	163.1	111.0

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	2.0	6.2	-30.7	-49.1	57.9	6.5	1
2	2.2	1.1	-34.3	-46.3	57.6	1.1	3
3	1.2	1.1	-50.7	6.0	51.1	1.3	4
4	2.4	3.5	-33.8	13.9	36.5	6.0	7
5	2.7	3.8	-32.2	19.0	37.4	6.2	7
6	2.2	3.5	-27.6	17.6	32.7	6.8	7
7	2.4	2.7	-28.5	21.0	35.4	4.7	7
8	1.4	6.3	-34.7	24.3	42.4	9.1	7
9	2.2	1.1	-25.1	21.9	33.3	2.1	7
10	1.8	4.5	-25.6	28.9	35.5	7.8	7
11	2.6	1.1	-15.7	29.3	33.3	2.0	7
12	2.3	1.1	-14.2	30.1	33.3	1.9	7
13	1.2	2.3	-16.5	40.9	44.1	4.0	7
14	1.9	3.2	-10.4	31.8	33.4	5.9	7
15	2.1	1.1	-7.3	32.3	33.3	1.9	7
16	1.5	7.3	-5.5	36.1	36.5	12.1	7
17	1.1	1.5	-4.1	42.4	42.6	2.1	13
18	1.3	1.2	-3.5	66.9	67.0	1.1	15
19	1.2	11.7	-3.4	30.6	30.8	23.2	7
20	1.4	5.4	-.5	23.7	23.8	13.8	10
21	1.1	2.2	2.8	47.8	47.9	2.8	17
22	1.2	3.4	7.3	47.4	48.0	12.0	17
23	.8	1.5	6.3	25.1	25.9	3.5	19
24	1.1	7.3	22.5	43.5	48.9	9.8	21
25	1.0	1.6	10.4	20.3	22.8	4.3	20
26	.9	2.2	14.5	22.0	26.3	5.1	23
27	2.7	4.6	50.2	66.0	83.0	3.4	26
28	2.5	3.2	43.9	56.3	71.4	2.7	26
29	2.7	1.9	66.2	78.4	102.6	1.1	28
30	3.0	1.3	68.6	81.3	106.4	1.1	32
31	2.6	13.0	42.3	50.3	65.7	9.3	25
32	2.2	3.5	67.0	74.6	100.3	2.1	28
33	2.6	11.6	53.5	61.5	81.5	8.7	26
34	.9	3.5	37.0	39.9	54.4	4.0	30
35	3.0	33.4	75.3	80.3	110.1	16.5	32
36	.8	1.1	22.2	20.9	30.5	2.1	33
37	2.9	16.3	71.2	67.4	98.0	10.2	27

TOTAL IDD= 36 11 16 17

EOF READ ON UNIT 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	2.29	21.0	-27.7	-47.3	54.9	2.5			1
2	20	575.39	42.5	-24.9	21.3	32.7	1074.8			7
3	20	1.44	22.0	-3.3	38.3	38.4	2.3			9
4	20	1.27	21.0	-24.3	-32.1	40.3	1.9			5
5	20	2.04	21.5	.0	20.3	20.3	6.2			-11
6	20	23.35	23.6	15.3	22.2	27.0	53.8			19
7	20	11.33	22.1	4.5	46.3	47.0	14.7			13
8	20	14.93	23.0	22.8	42.3	48.1	19.0			20
9	20	18.75	22.1	8.9	45.4	46.2	24.6			16
10	20	4.51	22.6	26.2	38.3	45.9	5.9			21
11	20	31.19	23.1	5.1	24.3	24.8	76.7			-18
12	20	144.52	33.0	44.2	53.3	69.3	127.5			22
13	20	61.71	25.9	55.2	60.3	82.1	46.0			23
14	20	4.35	22.6	35.5	37.0	52.3	5.2			25
15	20	1.72	21.0	38.2	35.7	54.4	1.9			26
1	40	144.10	45.0	-25.3	20.1	32.8	268.5			7
2	40	8.66	45.9	-10.4	31.5	33.2	15.9			7
3	40	2.53	44.6	42.1	58.3	65.6	2.5			22

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.3	115.0	115.0

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
5	21.8	1037.8	3.2	0.0	1.5	-.88818E-15
6	22.8	854.6	1.5	-4.3	11.8	.55763E-01
7	21.0	216.4	0.0	1.6	1.1	-.88818E-15
10	31.2	122873.5	215.6	-155.9	27.6	.34153E-02

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	52.7	3.1	-32.3	13.0	34.6	5.4	2.21	-.34	-.50	-2.06	7
2	52.4	2.0	-32.0	18.6	37.0	3.3	2.33	-1.32	.36	.23	7
3	52.0	6.2	-25.8	18.6	32.6	11.5	2.20	2.12	-1.07	-.53	7
4	54.5	2.0	-24.1	21.6	32.3	3.8	1.72	2.38	1.43	2.06	7
5	50.4	3.6	-18.8	24.6	31.0	7.1	1.71	.85	1.27	1.93	7
6	50.0	1.1	-11.1	31.4	33.3	2.0	1.43	2.21	.41	1.44	7
7	22.7	6.9	4.6	47.0	47.2	8.9	.98	-.19	-.29	-4.28	13
8	22.1	18.7	8.8	45.3	46.2	24.8	1.02	-.11	-.21	-6.99	16
9	25.5	2.4	6.2	24.9	25.7	5.8	.62	-.15	-.35	-6.53	16
10	24.0	7.8	23.1	42.2	48.1	9.9	.70	-.13	.08	1.01	20
11	22.7	4.5	26.2	38.8	46.8	5.9	.76	-.02	-.11	.87	21
12	36.6	3.0	46.0	56.4	72.8	2.5	2.56	-.30	2.07	1.64	22
13	25.5	6.0	16.4	22.4	27.8	13.2	.63	-.28	-.26	.74	19
14	33.5	2.8	52.9	62.1	81.5	2.1	2.25	.42	-2.50	-4.60	23
15	27.3	4.1	56.8	64.2	85.7	2.9	2.23	-.96	-.00	-8.18	23
16	22.6	4.3	35.4	37.0	51.2	5.2	1.02	.12	-.15	-.62	25
17	24.3	14.0	59.3	56.1	81.7	10.5	1.81	.16	-.33	-9.21	23

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	.8	1.9	-33.4	23.3	40.7	2.6	.9	-.8	7
2	.7	2.8	-29.7	25.8	39.4	4.4	.8	.7	7
3	.9	2.6	-26.5	26.8	37.7	4.2	.9	-.9	7
4	3.6	1.6	-19.3	24.3	31.1	3.2	1.6	3.6	7
5	2.4	1.1	-17.9	25.2	30.9	2.1	2.1	-.3	7
6	.7	2.0	-23.6	35.2	42.4	2.9	1.1	-.7	7
7	.9	1.3	-21.2	35.4	41.2	1.9	1.5	-.9	7
8	2.0	1.1	-18.3	30.0	35.1	1.9	1.5	.1	7
9	2.1	1.5	-11.9	30.1	32.4	2.9	1.3	-2.1	7
10	.7	1.4	-10.7	26.5	28.5	3.1	1.1	-.7	7
11	.9	7.4	-14.2	36.1	38.7	11.7	1.1	-.9	7
12	.9	1.2	-11.8	36.5	38.4	1.9	1.1	-.9	7
13	1.8	1.3	-6.4	36.0	36.5	2.1	1.2	1.6	7
14	.9	1.1	-4.4	33.0	33.3	2.0	1.3	.9	7
15	.6	1.6	1.1	24.1	24.1	4.0	.8	-.6	18
16	.7	1.1	7.1	24.5	25.5	2.7	.8	-.7	18
17	.5	1.8	14.5	22.8	27.1	4.0	.5	-.5	19
18	.3	1.5	27.0	36.3	46.1	1.9	1.0	-.3	21
19	.7	1.8	16.6	22.7	28.1	3.9	.7	-.7	19
20	3.1	1.1	45.0	58.2	73.5	.9	2.3	-3.1	22
21	2.5	1.3	41.8	52.6	67.3	1.1	2.0	2.5	22
22	2.7	1.4	53.2	62.4	82.0	1.1	2.3	-2.7	23
23	2.3	1.0	43.1	48.8	65.1	1.0	2.5	-2.3	22
24	1.8	1.3	52.5	59.3	79.2	1.0	2.5	-1.8	23
25	.8	1.3	56.2	63.5	84.9	1.0	1.8	.8	23
26	3.3	1.3	45.9	50.1	67.9	1.1	2.2	3.3	22
27	2.1	1.3	48.4	52.9	71.7	1.1	2.2	-2.1	22
28	.3	1.0	19.6	21.3	29.1	2.2	1.0	-.0	19
29	1.1	1.3	56.3	57.0	80.1	1.0	1.7	-1.1	23
30	.4	1.6	36.1	36.6	51.4	1.9	1.3	-.4	25
31	1.9	1.1	49.7	50.3	70.9	1.0	2.2	1.9	22
32	1.0	1.2	60.2	57.0	82.3	.9	1.8	-1.0	23

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1935	38	7.0	115.0	115.0

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	1.7	1.6	-28.1	-47.6	55.3	1.8	1
2	2.6	3.3	-33.6	13.6	36.3	6.4	7
3	2.5	2.9	-28.4	18.2	33.7	5.2	7
4	2.6	3.3	-30.1	20.4	36.4	5.6	7
5	2.4	4.7	-25.2	20.3	32.4	9.0	7
6	2.0	1.5	-23.9	23.1	33.3	2.6	7
7	2.0	7.0	-20.9	24.5	32.2	13.3	7
8	1.4	7.9	-26.9	34.0	43.3	11.2	7
9	1.8	7.5	-19.3	29.8	35.5	12.9	7
10	2.0	1.0	-14.3	29.6	32.8	1.9	7
11	1.8	6.1	-9.4	32.3	33.7	11.1	7
12	1.5	1.4	-3.3	38.3	38.4	2.3	9
13	1.8	1.6	-3.0	29.1	29.2	3.2	7
14	1.3	2.2	5.7	46.0	46.4	2.9	13
15	1.0	3.3	3.0	25.5	25.6	7.6	18
16	1.1	4.5	8.3	43.2	43.9	6.3	16
17	1.0	1.6	6.8	24.4	25.3	3.9	18
18	1.0	2.5	8.6	25.6	27.0	5.6	18
19	1.0	5.6	23.7	41.7	48.0	7.2	20
20	1.0	2.8	12.8	21.6	25.1	6.9	19
21	1.0	1.1	14.3	21.4	25.7	2.6	19
22	1.0	1.5	27.0	38.3	46.9	1.9	21
23	2.7	5.5	46.4	57.8	74.1	4.6	22
24	2.6	2.9	56.8	65.5	86.7	2.0	23
25	2.7	14.1	44.1	51.0	67.5	12.7	22
26	2.5	14.9	53.1	61.2	81.0	11.3	23
27	1.2	3.4	35.9	37.0	51.6	4.0	25
28	.7	1.7	36.2	38.6	54.3	1.9	26
29	2.5	2.6	58.9	57.7	82.4	1.9	23

TOTAL IDD= 29 9 10 12

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

TOTAL IDD= 1 1 1 1

EOF READ ON UNIT 1

NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	8.0	147.2	132.1

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	1.87	21.0	-24.6	-45.9	52.0	2.2			1
2	20	1.01	21.0	-25.9	-47.2	53.9	1.1			2
3	20	589.18	42.5	-23.2	22.0	32.0	1126.2			5
4	20	13.18	21.7	-22.9	-33.3	40.4	19.9			4
5	20	2.38	21.8	-.2	36.9	36.8	4.0			9
6	20	2.35	21.4	2.5	28.5	28.7	6.3			-13
7	20	23.51	23.5	4.9	23.3	24.3	59.1			12
8	20	39.84	22.5	8.5	43.0	43.8	55.6			14
9	20	15.19	22.7	13.2	21.5	25.2	36.8			17
10	20	5.24	22.3	25.8	40.5	48.0	6.7			18
12	20	96.30	30.6	44.0	53.2	69.8	85.9			20
1	40	147.07	48.0	-23.8	21.2	31.9	281.9			5
2	40	8.01	43.1	-9.1	31.3	33.1	14.8			5

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	8.0	147.2	132.1

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL
4	22.7	2826.0	-8.6	-5.5	34.3	.78157E+00
7	22.3	889.4	-2.0	-10.7	24.0	.92030E-01

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	5.0	147.2	132.1

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	LOCATION RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	MEAN FIXED CONTOUR REFERENCE
1	21.6	13.2	-22.9	-33.3	40.4	19.9	1.30	-.22	-.38	-.96	4
2	49.6	5.0	-30.9	13.7	33.9	9.1	1.97	-.16	.15	-1.18	5
3	28.9	4.9	-35.8	23.7	42.9	7.0	1.02	.30	-.06	-4.17	5
4	53.8	2.3	-26.6	18.6	32.4	4.4	2.35	3.15	1.35	3.05	5
5	57.0	1.1	-25.2	18.7	31.4	2.1	2.06	2.52	-1.15	2.14	5
6	55.6	1.3	-22.5	23.2	32.3	2.4	1.77	2.02	-1.90	.59	5
7	44.9	2.2	-9.7	31.3	32.8	4.1	1.21	-3.94	-.53	-10.50	5
8	21.7	2.4	-.1	36.8	36.8	4.0	.93	-.11	-.13	-2.55	9
9	25.8	2.0	2.0	24.6	24.7	4.9	.80	.69	3.76	-3.02	12
10	22.8	30.2	8.4	42.9	43.7	42.2	1.04	-.53	.33	-5.78	14
11	22.2	5.2	25.8	40.5	48.0	6.7	.85	.02	-.06	-9.46	18
12	40.6	2.9	42.5	51.4	66.7	2.6	2.22	1.36	1.21	-6.72	20
13	32.9	2.2	47.0	57.3	74.1	1.8	2.62	.23	1.21	-9.05	20
14	25.6	3.5	47.0	51.1	69.5	3.1	2.17	-1.61	-.05	-7.94	20

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	6.0	147.2	132.1

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	1.4	1.2	-33.0	17.7	37.5	1.9	.7	-1.4	5
2	.4	1.3	-36.6	25.3	44.5	1.8	1.2	-.4	5
3	5.3	1.2	-25.3	28.9	38.4	1.5	1.4	-.3	5
4	2.1	1.4	-27.2	31.6	41.7	2.0	1.2	.1	5
5	7.3	2.4	-22.3	28.9	36.5	4.0	.9	7.3	5
6	5.0	1.1	-18.7	24.7	31.0	2.1	1.8	5.0	5
7	2.5	1.1	-18.5	27.9	33.7	1.9	1.7	-2.5	5
8	.9	1.5	-22.4	35.7	42.1	2.1	1.2	-.9	5
9	2.2	1.1	-16.3	27.4	31.3	2.0	1.7	-2.2	5
10	1.0	1.1	-13.2	34.1	36.5	1.6	.3	-1.0	5
11	.6	1.8	-15.0	38.9	41.7	2.6	1.2	-.6	5
12	.9	1.1	-10.6	36.9	36.4	1.6	1.3	-.9	5
13	1.3	1.1	-6.8	35.9	36.5	1.8	.9	-1.3	5
14	1.1	1.1	11.3	45.4	46.3	1.4	1.2	-1.1	14
15	.9	1.0	6.4	22.4	23.3	2.6	.7	-.9	12
16	2.2	2.6	44.5	60.0	75.0	2.1	2.3	-2.2	20
17	3.8	1.2	43.3	53.6	68.3	1.1	2.8	-3.8	20

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1936	41	9.0	147.2	132.1

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	2.0	1.9	-24.6	-45.8	52.0	2.2	1
2	2.2	1.0	-25.9	-47.2	53.9	1.1	2
3	1.6	4.2	-22.6	-35.2	42.0	6.1	4
4	2.7	4.1	-33.9	15.2	37.1	6.7	5
5	1.9	1.4	-35.1	17.5	39.2	2.1	5
6	2.2	1.7	-28.0	16.9	32.7	3.3	5
7	2.7	1.3	-26.4	18.0	31.9	1.9	5
8	2.6	3.6	-26.6	20.6	33.7	17.4	5
9	2.2	1.3	-17.3	31.1	35.6	2.3	5
10	1.7	1.6	-14.2	28.7	32.0	3.0	5
11	2.4	1.0	-10.6	29.5	31.4	2.0	5
12	1.4	16.1	-12.9	38.5	40.6	24.3	5
13	1.6	8.6	-8.7	32.0	33.1	15.6	5
14	1.9	3.9	-6.1	33.4	33.9	7.1	5
15	1.3	1.9	-3.9	28.3	28.6	4.0	5
16	1.1	1.8	.1	36.7	36.7	3.1	9
17	.9	2.7	2.2	20.5	20.6	7.9	13
18	.9	5.4	2.9	24.9	25.0	15.7	12
19	1.1	2.2	7.2	21.8	22.9	5.9	12
20	1.1	2.8	11.9	21.1	24.2	6.9	17
21	1.1	1.6	27.1	39.9	48.3	2.3	19
22	1.0	1.8	15.6	21.7	26.7	4.2	17
23	2.6	11.4	44.3	52.0	68.3	10.2	20
24	2.6	18.9	48.0	56.4	74.0	15.6	20

TOTAL IDD= 21 6 9 9
EOF READ ON UNIT 1
NO OF RECORDS/RADIAL 4 CELL WIDTH 937.2 METERS PRF 794.0

FIXED CONTOUR ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

ID	THRESHOLD (DBZ)	AREA (KM**2)	AVERAGE REFLECTIVITY (DBZ)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	TOTAL PRECIP (TONS/HR)	AVERAGE PRECIP (MM/HR)	FIXED CONTOR REFERENCE
1	20	39.07	22.0	-20.7	-33.1	39.0	61.3			1
2	20	648.71	43.5	-22.6	22.0	31.6	1256.9			2
3	20	4.78	22.3	3.5	20.3	21.2	13.8			-7
4	20	5.70	21.8	7.5	19.3	21.3	16.6			-12
5	20	2.13	21.0	6.1	44.4	44.8	2.9			9
6	20	1.60	21.8	10.1	19.5	22.2	4.4			13
7	20	25.41	28.6	43.8	51.4	67.6	23.0			14
8	20	2.36	22.0	48.5	56.5	74.5	1.3			15
1	40	4.79	43.2	-8.0	32.0	33.0	8.9			2
2	40	137.18	49.9	-22.9	21.5	31.5	266.5			2

WIND DATA

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

HEIGHT (KM)	AVERAGE REFLECTIVITY (DBZ)	TOTAL REFLECTIVITY (DBZ.KM**2)	AVERAGE U (M/SEC)	AVERAGE V (M/SEC)	VELOCITY VARIANCE (M/SEC)**2)	DEL

PEAK DETECTED CELL ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1907	37	9.0	135.2	112.9

ID	REFLECTIVITY (DBZ)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	LOCATION RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE RADIAL SHEAR (M/S/KM)	AVERAGE TANGENTIAL SHEAR (M/S/KM)	AVERAGE RADIAL VELOCITY (M/S)	PEAK FIXED CONTOUR REFERENCE
1	22.3	26.8	-20.7	-33.5	39.4	61.6	1.56	-.62	-.41	-.85	1
2	43.8	1.3	-33.6	17.7	36.0	2.1	2.53	3.41	-3.08	-2.22	2
3	48.0	1.2	-30.7	18.9	36.1	2.0	2.11	-2.42	3.37	.70	2
4	59.7	2.1	-24.4	18.8	30.9	4.2	2.21	3.30	.25	-6.19	2
5	47.6	2.8	-27.2	23.2	35.7	4.7	2.33	-.67	3.48	-5.49	2
6	58.9	1.0	-20.6	24.9	32.3	1.9	1.65	-1.27	-.54	-1.85	2
7	53.0	1.9	-18.2	23.5	29.8	3.9	1.83	-.36	-.52	-1.23	2
8	51.4	1.4	-16.6	25.6	30.5	2.9	1.83	1.49	-.13	2.11	2
9	23.2	8.8	-11.7	39.0	40.7	13.3	1.05	-.28	-.17	.07	2
10	44.2	2.1	-8.2	31.5	32.5	3.9	1.29	1.12	-.19	.44	2
11	24.5	2.5	5.8	37.7	38.2	4.0	.95	3.50	3.91	-4.83	2
12	22.8	3.0	3.8	21.1	21.4	8.6	.77	-1.10	1.68	-4.47	7
13	21.8	5.7	7.5	19.9	21.3	15.3	.83	-.31	.06	-7.30	12
14	21.7	1.6	10.2	19.8	22.3	4.4	1.94	-.14	-.26	-8.10	13
15	33.0	4.3	43.7	51.4	67.5	3.9	2.24	-.81	-1.65	-8.82	14

TANGENTIAL SHEAR MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
226	1937	37	9.0	135.2	112.9

ID	MAGNITUDE SHEAR (M/S/KM)	AREA (KM**2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	AVERAGE VELOCITY SPREAD (M/S)	AVERAGE SHEAR (M/S/KM)	FIXED CONTOUR REFERENCE
1	1.3	1.3	-24.8	32.9	41.3	1.9	1.4	-1.3	2
2	4.7	1.1	-18.0	25.2	30.3	2.1	2.1	4.7	2
3	2.1	1.5	-14.9	25.9	29.3	3.2	1.5	-.7	2
4	1.0	1.4	-17.7	36.2	40.3	2.1	1.8	-1.0	2
5	.9	1.8	-15.5	34.6	37.3	2.9	1.3	.4	2
6	.6	4.1	-14.1	39.2	41.7	6.0	1.0	-.6	2
7	1.6	1.5	-5.9	29.6	30.1	3.0	1.6	-1.6	2
8	3.8	1.1	-6.3	33.2	33.7	1.9	2.2	-3.8	2
9	1.6	1.1	-4.3	31.6	31.3	2.0	1.2	-1.6	2
10	.9	1.1	.1	34.2	34.2	1.9	1.1	-.9	2

VELOCITY SPREAD MAXIMA ATTRIBUTES

DAY	HHMM	SS	ELE	AZM1	AZM2
225	1937	37	9.0	135.2	112.9

ID	SPREAD (M/S)	AREA (KM2)	LOCATION EAST (KM)	LOCATION NORTH (KM)	RANGE (KM)	AREA RESOLUTION ELEMENTS	FIXED CONTOUR REFERENCE
1	2.4	2.6	-20.0	-36.6	41.9	4.0	1
2	1.6	3.1	-23.7	-29.5	37.8	5.1	1
3	2.8	2.5	-33.1	17.3	37.4	4.0	2
4	2.6	2.6	-30.8	19.7	36.6	4.4	2
5	2.6	13.8	-25.9	21.3	33.5	19.7	2
6	1.9	5.3	-23.5	26.3	36.8	10.0	2
7	2.7	1.1	-18.6	26.3	32.3	2.1	2
8	2.5	1.3	-20.9	32.2	38.4	2.1	2
9	2.0	1.1	-17.9	28.7	33.8	1.9	2
10	2.1	3.5	-16.6	30.8	35.0	6.1	2
11	2.0	6.1	-15.3	27.2	31.2	12.0	2
12	1.8	7.0	-17.1	37.4	41.2	10.5	2
13	1.9	1.1	-10.9	32.0	33.8	2.0	2
14	2.0	4.3	-5.9	33.2	33.7	7.6	2
15	1.0	4.2	4.6	31.6	32.8	7.9	7
16	1.3	13.6	7.0	38.9	39.5	21.0	2
17	1.0	3.4	7.8	19.9	21.4	9.7	12
18	1.9	1.5	10.2	19.8	22.3	4.4	13
19	1.2	1.1	49.1	56.0	74.5	.9	15
20	2.3	14.3	44.5	51.5	68.1	12.6	14

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TOTAL IDD=   16     5     9     8
        NO OF RECORDS/RADIAL  4    CELL WIDTH  937.2  METERS     PRF   794.0
        NO OF RECORDS/RADIAL  4    CELL WIDTH  937.2  METERS     PRF   794.0
        NO OF RECORDS/RADIAL  4    CELL WIDTH  937.2  METERS     PRF   794.0
EOF READ ON UNIT 1
EOF READ ON UNIT 1

 P   227034  A0  004303  B0  000000
 RA  076500  A1  000001  B1  000001   C(A1)=  0102  2420  0000  0000  0000   C(B1)=  0102  2420  0000  0000  0000
 FL  227100  A2  223551  B2  000000   C(A2)=  3232  3232  3205  0600  0025   C(B2)=  0000  0000  0000  0000  0000
 EM  000700  A3  170060  B3  000115   C(A3)=  1000  0000  0000  0017  0407   C(B3)=  5555  5555  5555  5555  5555
 RE  000000  A4  215607  B4  000000   C(A4)=  0000  0000  0000  0000  0000   C(B4)=  0000  0000  0060  0000  0000
 FE  000000  A5  004315  B5  000000   C(A5)=  2000  0000  0300  0001  6023   C(B5)=  0000  0300  0000  0000  0000
 MA  001400  A6  000001  B6  211373   C(A6)=  0102  2420  0000  0000  0000   C(B6)=  0400  2113  4761  0004  6000
             A7  000001  B7  227100   C(A7)=  0102  2420  0000  0000  0000   C(B7)=
 X0  4000  0000  0000  0000  0115
 X1  0000  0000  0000  0000  0000
 X2  0311  1720  0000  0000  0000
 X3  0000  0000  0000  0022  3565
 X4  0000  0000  0000  0000  0000
 X5  0000  0000  0020  0000  0003
 X6  0102  2420  0000  0000  0000
 X7  0311  1720  0000  0022  3551

  00000   00000 00000 00000 00000     01022 42003 00000 00000     11162 02524 00000 00175     17252 42025 24000 02240
  00004   24012 00540 00000 00175     24012 00541 00000 02240     24012 00534 00000 04303     24012 00535 00000 04344
  00010   24012 00544 00000 06407     04053 22507 00000 02240     24012 00536 00000 10452     24012 00537 00000 12515
  00014   00000 00000 00000 00000
  00054  -56110 03110 00054 54710     61100 00001 03110 00055     64550 02550 00000 46000     15230 70000 01000 00070
  00060   15051 52000 00000 00061     00002 27100 00000 00001     07040 00060 51600 00001     04000 00063 00000 00021
  00064   14071 70000 00000 00000     00000 00000 00002 27071     40000 00000 00000 00111     00000 00000 40000 00000
  00070   14071 75755 55555 50000     00000 06060 00000 00000
  00100  -54000 00000 31000 00001

 226734   04002 26744 61000 46000     50100 00001 43770 20146     15117 62217 77767 46000     04202 26744 66530 43771
 226740   50100 00001 20140 15117     62217 77773 05202 26745     50100 00014 43744 20130     15117 63513 66554 46000
 226744   66334 46000 61000 46000     50100 00020 43752 20166     11771 76130 12771 20706     54710 50100 00015 43752
 226750   11771 76150 12771 54710     50100 00015 43744 20152     11771 20722 54710 46000     50100 00015 76710 20763
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FWA OF THE LOAD 111
LWA+1 OF THE LOAD 34170

TRANSFER ADDRESS -- EXPAND 6315

PROGRAM AND BLOCK ASSIGNMENTS.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER LEVEL	HARDWARE	COMMENTS
/HEAD/	111	15						
/EXPAN/	126	10						
EXPAND	136	7463	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
/LINUM/	7621	1						
BLKDAT.	7622	0	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
EXPAN1	7622	343	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
MUSCAL	10165	77	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
LABEL	10264	125	LGO	05/03/78	FTN	4.6 428	666X I	OPT=1
/NAME/	10411	6						
/NAMIT/	10417	1						
/CHEXP/	10420	1						
/TAGIT/	10421	1						
/SAVORG/	10422	5						
PLTIO3	10427	171	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
BLOXIT	10620	54	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOT	10674	325	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
ENDPLT	11221	160	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
CHEXIT	11401	11	UL-PEN	10/14/76	COMPASS	3. 2-414		
FACTOR	11412	16	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
SYMBOL	11430	307	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOTDQ	11737	432	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOCODE	12371	425	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
DOTX	13016	41	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOTTX	13057	23	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
WHERE	13102	52	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
ERXPLT	13154	235	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
NUMBER	13411	233	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
NEWPEN	13644	66	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
PLOTS	13732	75	UL-PEN	10/14/76	FTN	4.5 414	666X I	OPT=2
BUFF	14027	467	UL-PEN	10/14/76	COMPASS	3. 2-414		
ABORTS	14516	4	UL-PEN	10/14/76	COMPASS	3. 2-414		
LINLOG	14522	1115	UL-LIB	02/16/78	FTN	4.6 428	666X I	OPT=1
DAY	15637	10	UL-LIB	02/16/78	FTN	4.6 428	666X I	OPT=1
PAGE	15647	33	UL-LIB	02/16/78	FTN	4.6 428	666X I	OPT=1
/STP.END/	15702	1						
/FCL.C./	15703	23						
/Q8.IO./	15726	133						
Q8NTRY=	16061	0	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FCL INITIALIZATION ROUTINE.
FECMSK=	16061	41	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		INITIALIZE CONSTANTS.
FLTOUT=	16122	311	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		COMMON FLOATING OUTPUT CODE
FORSYS=	16433	603	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FORTRAN OBJECT LIBRARY UTILITIES.
INCOM=	17236	276	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		COMMON INPUT FORMATTING CODE
NAMOUT=	17534	274	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		NAMELIST OUTPUT ROUTINE.
OUTC=	20030	172	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		FORMATTED WRITE FORTRAN RECORD.
SYSTEMC	20222	407	SL-FORTRAN	08/12/77	COMPASS	3. 3-428		EXTENDED ERROR HANDLING OPTION.

BLOCK	ADDRESS	LENGTH	FILE	DATE	PROCSSR	VER	LEVEL	HARDWARE	COMMENTS
CLOCK=	20631	31	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		ACCESS SYSTEM CLOCKS FOR FORTRAN.
GOTOER=	20662	14	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTED GO TO ERROR PROCESSOR.
ALOG	20676	73	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMPUTE COMMON AND NATURAL LOGARITHMS. OPT=ALL.
SINCOS=	20771	66	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TRIGONOMETRIC SINE OR COSINE OF X. OPT=ALL.
SYSAID=	21057	1	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LINK BETWEEN SYS=AID AND INITIALIZATION CODE.
BACKSP=	21060	56	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BACKSPACE LOGICAL RECORD.
COMIO=	21136	64	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON CODED I/O ROUTINES AND CONSTANTS.
EOF	21222	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		TEST FOR END OF FILE STATUS.
FLTIN=	21240	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON FLOATING INPUT CONVERTER.
FMTAP=	21414	352	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		CRACK APLIST AND FORMAT FOR KODER/KRAKER.
FORUTL=	21766	16	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		FCL MISC. UTILITIES.
GETFIT=	22004	42	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		LOCATE AN FIT GIVEN A FILE NAME.
/IO.BUF./	22046	227							
INPB=	22275	314	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		BINARY READ FORTRAN RECORD.
KODER=	22611	456	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		OUTPUT FORMAT INTERPRETER.
NAMIN=	23267	523	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		NAMELIST INPUT ROUTINE.
OUTCOM=	24012	154	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		COMMON OUTPUT CODE
SYSTEM	24166	21	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		USER CALLABLE ERROR PROCESSOR.
SYS=1ST	24207	62	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		MATH LIBRARY LINK TO ERROR MESSAGE PROCESSOR.
XTOI=	24271	10	SL-FORTRAN	08/12/77	COMPASS	3.	3-428		REAL TO INTEGER EXPONENTIATION.
/CON.RM/	24301	6							
CIO.RM	24307	40	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/AUB.RM/	24347	10							
MOVE.RM	24357	64	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
MCT.RM	24443	233	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/JMPS.RM/	24676	11							
/MEMC.RM/	24707	3							
/OPES.FO/	24712	1							
/OPEN.FO/	24713	7							
OPEN.RM	24722	237	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/PUT.RT/	25161	11							
PLEQ.RM	25172	42	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSF.FO/	25234	7							
CLSF.SQ	25243	134	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/CLSV.FO/	25377	7							
CLSV.SQ	25406	137	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/REW.FO/	25545	7							
REW.SQ	25554	33	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/TERM.RM/	25607	1							
/GET.FO/	25610	7							
/GET.BT/	25617	5							
/GET.RT/	25624	11							
GET.SQ	25635	1134	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
Z.SQ	26771	101	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
W.SQ	27072	50	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
FSU.SQ	27142	106	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/SKBL.FO/	27250	7							
/SKSB.FO/	27257	1							
SKSB.SQ	27260	101	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
ERR.RM	27361	404	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
CHWR.SQ	27765	7	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OSUB.RM	27774	71	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OPEN.SQ	30065	254	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
OPEX.SQ	30341	14	SL-SYSIO	09/03/76	COMPASS	3.	2-414		
/PUT.FO/	30355	7							

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LOAD MAP - EXPAND                                   CYBER LOADER 1.1-428        05/03/78  10.00.41.      PAGE     3

PUT.RM        33364        2  SL-SYSIO     09/03/76 COMPASS  3. 2-414
PUT.SQ        30366     1400  SL-SYSIO     09/03/76 COMPASS  3. 2-414
WAR.SQ        31766      268  SL-SYSIO     09/03/76 COMPASS  3. 2-414
CLSF.RM       32246       25  SL-SYSIO     09/03/76 COMPASS  3. 2-414
BTRT.SQ       32273      115  SL-SYSIO     09/03/76 COMPASS  3. 2-414
WFOX.SQ       32410      150  SL-SYSIO     09/03/76 COMPASS  3. 2-414
/SKFL.FO/     32560        7
SKFL.SQ       32567       51  SL-SYSIO     09/03/76 COMPASS  3. 2-414
SKBL.SQ       32640     1026  SL-SYSIO     09/03/76 COMPASS  3. 2-414
MXGET         33666       33  SL-NUCLEUS   02/05/74 COMPASS  3. 73269
MXPUT         33721       22  SL-NUCLEUS   02/05/74 COMPASS  3. 73269
RECOVR        33743      166  SL-NUCLEUS   04/15/77 COMPASS  3. 2-414          REPRIEVE INTERFACE
SYS.RM        34131       37  SL-NUCLEUS   04/15/77 COMPASS  3. 2-414          PROCESS SYSTEM REQUEST.

       1.058 CP SECONDS               474033 34 STORAGE USED               105 TABLE MOVES
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$INPUT
IPLT   = T, T, T, T,
Z1     = T,
Z2     = F,
Z3     = F,
Z4     = F,
LS     = T,
XK1    = -.7E+02,
XK2    = .1E+02,
YK1    = -.1E+02,
YK2    = .7E+02,
LK     = T,
$END
RANGE=  512. CELLWIDTH= 1.042 ELEVATION= 10.02
X1(KM)=    -80.  Y1(KM)=   -20.  X2(KM)=    20.  Y2(KM)=    80.
X1(IN)=   1.00  Y1(IN)=   1.00  X2(IN)=   9.00  Y2(IN)=   9.00
   3.153  2.817 3001  3.126  2.779 2001  OUTSIDE PLOT AREA   6.047   .710   6.004   .649
   3.153  2.817 3001  3.125  2.838 2001  OUTSIDE PLOT AREA   6.047   .710   6.001   .744
   3.126  2.779 3001  3.068  2.763 2001  OUTSIDE PLOT AREA   6.004   .649   5.911   .624
   3.125  2.838 3001  3.110  2.849 2001  OUTSIDE PLOT AREA   6.001   .744   5.979   .761
   3.068  2.763 3001  3.024  2.738 2001  OUTSIDE PLOT AREA   5.911   .624   5.841   .583
   3.110  2.849 3001  3.023  2.799 2001  OUTSIDE PLOT AREA   5.979   .751   5.839   .680
   3.024  2.738 3001  2.994  2.762 2001  OUTSIDE PLOT AREA   5.841   .583   5.792   .622
   3.023  2.799 3001  3.014  2.806 2001  OUTSIDE PLOT AREA   5.833   .680   5.825   .692
   3.014  2.806 3001  2.994  2.762 2001  OUTSIDE PLOT AREA   5.825   .692   5.792   .622
   3.144  3.066 3001  3.112  3.032 2001                      6.032  1.108   5.981  1.053
   3.080  2.997 3001  3.048  2.963 2001  OUTSIDE PLOT AREA   5.930   .998   5.879   .943
   3.144  3.066 3001  3.160  3.115 2001                      6.032  1.108   6.058  1.186
   3.112  3.032 3001  3.096  3.047 2001                      5.981  1.053   5.955  1.077
   3.080  2.997 3001  3.063  3.013 2001                      5.930   .998   5.903  1.023
   3.063  3.013 3001  3.048  2.963 2001                      5.903  1.023   5.879   .943
   3.160  3.115 3001  3.145  3.129 2001                      6.058  1.185   6.034  1.209
   3.145  3.129 3001  3.096  3.047 2001                      6.034  1.209   5.955  1.077
   2.159  2.125 3001  2.126  2.091 2001  OUTSIDE PLOT AREA   4.453  -.396   4.406  -.450
   2.094  2.058 3001  2.028  1.991 2001  OUTSIDE PLOT AREA   4.354  -.503   4.249  -.610
   2.159  2.125 3001  2.128  2.156 2001  OUTSIDE PLOT AREA   4.453  -.396   4.409  -.346
   2.128  2.156 3001  2.126  2.091 2001  OUTSIDE PLOT AREA   4.409  -.346   4.406  -.450
   2.094  2.058 3001  2.061  2.090 2001  OUTSIDE PLOT AREA   4.354  -.503   4.302  -.451
   2.061  2.090 3001  2.028  1.991 2001  OUTSIDE PLOT AREA   4.302  -.451   4.249  -.610
   3.013  3.063 3001  2.979  3.031 2001                      5.823  1.103   5.769  1.052
   3.013  3.063 3001  3.033  3.110 2001                      5.823  1.103   5.856  1.178
   2.979  3.031 3001  2.999  3.078 2001                      5.769  1.052   5.800  1.127
   3.033  3.110 3001  3.020  3.125 2001                      5.856  1.178   5.834  1.202
   2.999  3.078 3001  2.985  3.094 2001                      5.800  1.127   5.778  1.152
   3.020  3.125 3001  3.004  3.143 2001                      5.834  1.202   5.808  1.231
   2.985  3.094 3001  2.968  3.113 2001                      5.778  1.152   5.752  1.182
   3.004  3.143 3001  2.990  3.160 2001                      5.808  1.231   5.786  1.258
   2.968  3.113 3001  2.917  3.100 2001                      5.752  1.152   5.670  1.162
   2.087  2.410 3001  2.051  2.381 2001  OUTSIDE PLOT AREA   4.344   .060   4.266   .012
```

2.990	3.160	3001	3.312	3.207	2001		5.785	1.258	5.822	1.333
2.917	3.100	3001	2.976	3.177	2001		5.670	1.162	5.763	1.266
2.087	2.410	3001	2.061	2.443	2001	OUTSIDE PLOT AREA	4.344	.060	4.302	.112
2.061	2.443	3001	2.051	2.381	2001	OUTSIDE PLOT AREA	4.302	.112	4.286	.012
3.012	3.207	3001	2.963	3.193	2001		5.822	1.333	5.743	1.311
2.976	3.177	3001	2.926	3.164	2001		5.763	1.286	5.684	1.265
2.963	3.193	3001	2.988	3.237	2001		5.743	1.311	5.783	1.382
2.926	3.164	3001	2.913	3.181	2001		5.684	1.265	5.664	1.291
2.988	3.237	3001	2.976	3.255	2001		5.783	1.332	5.763	1.409
2.913	3.181	3001	2.900	3.199	2001		5.664	1.291	5.642	1.321
2.976	3.255	3001	2.963	3.272	2001		5.763	1.409	5.743	1.437
2.900	3.199	3001	2.886	3.218	2001		5.642	1.321	5.621	1.351
2.963	3.272	3001	2.990	3.316	2001		5.743	1.437	5.766	1.507
2.886	3.218	3001	2.873	3.237	2001		5.621	1.351	5.600	1.381
2.990	3.316	3001	2.981	3.330	2001		5.795	1.507	5.771	1.529
2.873	3.237	3001	2.863	3.253	2001		5.600	1.381	5.583	1.406
2.981	3.330	3001	2.968	3.349	2001		5.771	1.529	5.752	1.560
2.863	3.253	3001	2.849	3.274	2001		5.583	1.406	5.561	1.440
2.968	3.349	3001	2.917	3.342	2001		5.752	1.560	5.670	1.549
2.849	3.274	3001	2.877	3.318	2001		5.561	1.440	5.606	1.510
2.917	3.342	3001	2.947	3.384	2001		5.670	1.549	5.717	1.616
2.877	3.318	3001	2.825	3.313	2001		5.606	1.510	5.523	1.502
2.947	3.384	3001	2.937	3.402	2001		5.717	1.616	5.701	1.644
2.825	3.313	3001	2.814	3.333	2001		5.523	1.502	5.505	1.534
2.078	2.919	3001	2.037	2.896	2001	OUTSIDE PLOT AREA	4.329	.872	4.264	.836
2.937	3.402	3001	2.844	3.375	2001		5.701	1.644	5.553	1.602
2.814	3.333	3001	2.803	3.353	2001		5.505	1.534	5.487	1.566
2.078	2.919	3001	2.060	2.951	2001	OUTSIDE PLOT AREA	4.329	.872	4.300	.924
2.060	2.951	3001	2.037	2.896	2001	OUTSIDE PLOT AREA	4.300	.924	4.264	.836
2.844	3.375	3001	2.834	3.395	2001		5.553	1.602	5.537	1.633
2.803	3.353	3001	2.792	3.373	2001		5.487	1.566	5.470	1.599
2.126	3.027	3001	2.084	3.006	2001		4.405	1.046	4.339	1.012
2.834	3.395	3001	2.865	3.437	2001		5.537	1.633	5.586	1.701
2.792	3.373	3001	2.781	3.396	2001		5.470	1.599	5.452	1.634
2.126	3.027	3001	2.150	3.083	2001		4.405	1.046	4.445	1.135
2.084	3.006	3001	2.066	3.041	2001		4.339	1.012	4.310	1.068
1.982	3.000	3001	1.940	2.979	2001		4.176	1.002	4.109	.968
2.941	3.495	3001	2.899	3.475	2001		5.705	1.793	5.641	1.761
2.865	3.437	3001	2.856	3.455	2001		5.586	1.701	5.573	1.729
2.781	3.396	3001	2.729	3.394	2001		5.452	1.634	5.370	1.632
2.150	3.083	3001	2.136	3.111	2001		4.445	1.135	4.422	1.180
2.136	3.111	3001	2.066	3.041	2001		4.422	1.180	4.310	1.068
1.982	3.000	3001	2.009	3.051	2001		4.176	1.002	4.219	1.083
1.940	2.979	3001	1.967	3.031	2001		4.109	.968	4.152	1.051
2.941	3.495	3001	2.933	3.513	2001		5.705	1.793	5.695	1.822
2.933	3.513	3001	2.899	3.475	2001		5.695	1.822	5.641	1.761
2.856	3.455	3001	2.847	3.474	2001		5.573	1.729	5.558	1.760
2.729	3.394	3001	2.762	3.435	2001		5.370	1.632	5.422	1.697
2.293	3.221	3001	2.207	3.182	2001		4.672	1.355	4.535	1.293
2.009	3.051	3001	2.122	3.143	2001		4.219	1.083	4.399	1.231
1.967	3.031	3001	1.994	3.085	2001		4.152	1.051	4.194	1.137
2.847	3.474	3001	2.840	3.492	2001		5.558	1.760	5.546	1.788
2.762	3.435	3001	2.754	3.454	2001		5.422	1.697	5.408	1.728
2.293	3.221	3001	2.281	3.247	2001		4.672	1.355	4.653	1.397
2.207	3.182	3001	2.195	3.210	2001		4.535	1.293	4.516	1.337
2.195	3.210	3001	2.109	3.172	2001		4.516	1.337	4.378	1.277
2.109	3.172	3001	2.122	3.143	2001		4.378	1.277	4.399	1.231
2.066	3.153	3001	2.023	3.134	2001		4.310	1.247	4.241	1.217
1.994	3.085	3001	1.937	3.097	2001		4.194	1.137	4.103	1.157
2.840	3.492	3001	2.831	3.512	2001		5.546	1.788	5.532	1.819
2.754	3.454	3001	2.745	3.475	2001		5.408	1.728	5.394	1.762
2.281	3.247	3001	2.268	3.276	2001		4.653	1.397	4.633	1.444
2.182	3.240	3001	2.136	3.222	2001		4.495	1.386	4.425	1.357
2.066	3.153	3001	2.052	3.186	2001		4.310	1.247	4.287	1.299
2.052	3.186	3001	2.009	3.168	2001		4.287	1.299	4.218	1.270
2.009	3.168	3001	2.023	3.134	2001		4.218	1.270	4.241	1.217

1.937	3.097	3001	2.009	3.168	2001	4.103	1.157	4.218	1.270
2.831	3.512	3001	2.823	3.531	2001	5.532	1.619	5.519	1.551
2.745	3.475	3001	2.692	3.479	2001	5.394	1.762	5.310	1.768
2.344	3.340	3001	2.300	3.323	2001	4.753	1.546	4.684	1.518
2.268	3.276	3001	2.256	3.306	2001	4.633	1.444	4.614	1.491
2.182	3.240	3001	2.169	3.271	2001	4.495	1.386	4.475	1.435
2.169	3.271	3001	2.126	3.254	2001	4.475	1.435	4.405	1.407
2.126	3.254	3001	2.138	3.222	2001	4.405	1.407	4.425	1.357
2.009	3.168	3001	1.995	3.201	2001	4.213	1.270	4.196	1.324
2.823	3.531	3001	2.816	3.549	2001	5.519	1.651	5.508	1.880
2.692	3.479	3001	2.684	3.499	2001	5.310	1.768	5.296	1.600
2.344	3.340	3001	2.334	3.366	2001	4.753	1.546	4.737	1.587
2.300	3.323	3001	2.290	3.349	2001	4.684	1.518	4.667	1.560
2.256	3.306	3001	2.246	3.332	2001	4.614	1.491	4.597	1.533
1.995	3.201	3001	1.983	3.232	2001	4.196	1.324	4.177	1.373
2.816	3.549	3001	2.809	3.569	2001	5.506	1.680	5.496	1.912
2.684	3.499	3001	2.632	3.506	2001	5.298	1.800	5.214	1.810
2.334	3.366	3001	2.323	3.394	2001	4.737	1.587	4.721	1.632
2.290	3.349	3001	2.279	3.378	2001	4.667	1.560	4.650	1.606
2.246	3.332	3001	2.235	3.362	2001	4.597	1.533	4.580	1.581
2.058	3.298	3001	2.014	3.282	2001	4.298	1.479	4.227	1.453
1.983	3.232	3001	1.926	3.251	2001	4.177	1.373	4.086	1.402
2.809	3.569	3001	2.801	3.590	2001	5.496	1.912	5.485	1.944
2.713	3.559	3001	2.668	3.544	2001	5.343	1.896	5.272	1.871
2.632	3.506	3001	2.624	3.529	2001	5.214	1.810	5.201	1.847
2.446	3.468	3001	2.402	3.453	2001	4.917	1.750	4.847	1.726
2.323	3.394	3001	2.313	3.422	2001	4.721	1.632	4.705	1.677
2.279	3.378	3001	2.269	3.407	2001	4.650	1.606	4.634	1.653
2.269	3.407	3001	2.224	3.392	2001	4.634	1.653	4.563	1.629
2.224	3.392	3001	2.235	3.362	2001	4.563	1.629	4.580	1.581
2.180	3.377	3001	2.136	3.362	2001	4.492	1.604	4.421	1.580
2.058	3.298	3001	2.047	3.331	2001	4.298	1.479	4.279	1.531
2.014	3.282	3001	1.958	3.301	2001	4.227	1.453	4.137	1.483
1.926	3.251	3001	1.914	3.266	2001	4.086	1.402	4.066	1.459
2.801	3.590	3001	2.751	3.594	2001	5.485	1.944	5.404	1.951
2.713	3.559	3001	2.706	3.579	2001	5.343	1.896	5.332	1.927
2.706	3.579	3001	2.661	3.565	2001	5.332	1.927	5.261	1.904
2.661	3.565	3001	2.668	3.544	2001	5.261	1.904	5.272	1.871
2.624	3.529	3001	2.617	3.550	2001	5.201	1.847	5.190	1.881
2.446	3.468	3001	2.483	3.506	2001	4.917	1.750	4.976	1.811
2.402	3.453	3001	2.394	3.477	2001	4.847	1.726	4.833	1.765
2.394	3.477	3001	2.304	3.448	2001	4.833	1.765	4.691	1.719
2.304	3.448	3001	2.313	3.422	2001	4.691	1.719	4.705	1.677
2.260	3.434	3001	2.215	3.419	2001	4.620	1.695	4.548	1.672
2.180	3.377	3001	2.171	3.405	2001	4.492	1.604	4.477	1.649
2.171	3.405	3001	2.126	3.390	2001	4.477	1.649	4.406	1.626
2.126	3.390	3001	2.136	3.362	2001	4.406	1.626	4.421	1.580
2.047	3.331	3001	2.037	3.361	2001	4.279	1.531	4.263	1.579
1.958	3.301	3001	1.992	3.347	2001	4.137	1.483	4.192	1.556
1.914	3.286	3001	1.948	3.332	2001	4.066	1.459	4.120	1.533
3.013	3.697	3001	2.968	3.683	2001	5.623	2.116	5.751	2.094
2.751	3.594	3001	2.739	3.628	2001	5.404	1.951	5.465	2.006
2.617	3.550	3001	2.609	3.573	2001	5.190	1.881	5.178	1.918
2.483	3.506	3001	2.475	3.532	2001	4.976	1.811	4.963	1.852
2.430	3.518	3001	2.385	3.505	2001	4.891	1.830	4.820	1.808
2.260	3.434	3001	2.251	3.463	2001	4.620	1.695	4.605	1.742
2.251	3.463	3001	2.206	3.450	2001	4.605	1.742	4.533	1.720
2.206	3.450	3001	2.215	3.419	2001	4.533	1.720	4.548	1.672
2.206	3.450	3001	2.161	3.436	2001	4.533	1.720	4.461	1.698
2.037	3.361	3001	2.026	3.394	2001	4.263	1.573	4.246	1.633
2.026	3.394	3001	1.981	3.381	2001	4.246	1.633	4.175	1.611
1.981	3.381	3001	1.992	3.347	2001	4.175	1.611	4.192	1.556
1.948	3.332	3001	1.981	3.381	2001	4.120	1.533	4.175	1.611
1.443	3.216	3001	1.398	3.202	2001	3.315	1.347	3.243	1.325
3.013	3.697	3001	3.053	3.728	2001	5.823	2.116	5.867	2.166
2.968	3.683	3001	2.918	3.690	2001	5.751	2.094	5.670	2.104

2.789	3.628	3001	2.737	3.638	2001	5.465	2.006	5.382	2.021
2.609	3.573	3001	2.557	3.586	2001	5.178	1.918	5.094	1.939
2.475	3.532	3001	2.466	3.560	2001	4.963	1.852	4.950	1.897
2.430	3.518	3001	2.421	3.547	2001	4.891	1.830	4.878	1.877
2.385	3.505	3001	2.376	3.534	2001	4.820	1.808	4.806	1.856
2.286	3.509	3001	2.196	3.483	2001	4.661	1.815	4.517	1.773
2.206	3.450	3001	2.196	3.483	2001	4.533	1.720	4.517	1.773
2.196	3.483	3001	2.151	3.470	2001	4.517	1.773	4.445	1.753
2.151	3.470	3001	2.161	3.436	2001	4.445	1.753	4.461	1.698
1.981	3.381	3001	1.925	3.405	2001	4.175	1.611	4.085	1.649
1.443	3.216	3001	1.429	3.263	2001	3.315	1.347	3.292	1.422
1.429	3.263	3001	1.398	3.202	2001	3.292	1.422	3.243	1.325
3.053	3.728	3001	3.048	3.744	2001	5.887	2.166	5.879	2.192
2.918	3.690	3001	2.912	3.708	2001	5.678	2.104	5.662	2.133
2.737	3.638	3001	2.731	3.659	2001	5.382	2.021	5.373	2.055
2.557	3.586	3001	2.550	3.611	2001	5.094	1.939	5.083	1.978
2.550	3.611	3001	2.459	3.586	2001	5.083	1.978	4.938	1.939
2.459	3.586	3001	2.466	3.560	2001	4.938	1.939	4.950	1.897
2.421	3.547	3001	2.414	3.574	2001	4.878	1.877	4.866	1.919
2.414	3.574	3001	2.369	3.562	2001	4.866	1.919	4.793	1.900
2.369	3.562	3001	2.376	3.534	2001	4.793	1.900	4.806	1.856
2.286	3.509	3001	2.278	3.538	2001	4.661	1.815	4.649	1.861
2.278	3.538	3001	2.187	3.513	2001	4.649	1.861	4.504	1.822
2.187	3.513	3001	2.196	3.483	2001	4.504	1.822	4.517	1.773
1.925	3.405	3001	1.961	3.452	2001	4.085	1.649	4.142	1.725
3.048	3.744	3001	3.044	3.761	2001	5.879	2.192	5.873	2.217
2.912	3.708	3001	2.953	3.738	2001	5.662	2.133	5.727	2.181
2.731	3.659	3001	2.726	3.681	2001	5.373	2.055	5.364	2.090
2.407	3.601	3001	2.362	3.589	2001	4.855	1.962	4.782	1.944
1.961	3.452	3001	1.997	3.498	2001	4.142	1.725	4.200	1.798
3.044	3.761	3001	2.995	3.764	2001	5.873	2.217	5.794	2.224
2.953	3.738	3001	2.949	3.754	2001	5.727	2.181	5.721	2.207
2.726	3.681	3001	2.675	3.690	2001	5.364	2.090	5.283	2.104
2.407	3.601	3001	2.401	3.625	2001	4.855	1.962	4.845	2.001
2.362	3.589	3001	2.355	3.615	2001	4.782	1.944	4.772	1.984
1.997	3.498	3001	1.930	3.529	2001	4.200	1.798	4.188	1.847
2.995	3.764	3001	3.037	3.791	2001	5.794	2.224	5.861	2.267
2.949	3.754	3001	2.991	3.781	2001	5.721	2.207	5.788	2.251
2.675	3.690	3001	2.716	3.722	2001	5.283	2.104	5.348	2.156
2.401	3.625	3001	2.395	3.652	2001	4.845	2.001	4.835	2.045
2.395	3.652	3001	2.349	3.642	2001	4.835	2.045	4.762	2.029
2.349	3.642	3001	2.355	3.615	2001	4.762	2.029	4.772	1.984
2.120	3.593	3001	2.074	3.583	2001	4.396	1.949	4.323	1.933
1.990	3.529	3001	2.028	3.573	2001	4.188	1.847	4.249	1.918
3.037	3.791	3001	3.034	3.808	2001	5.861	2.257	5.856	2.293
2.991	3.781	3001	2.988	3.799	2001	5.788	2.251	5.782	2.278
2.716	3.722	3001	2.711	3.744	2001	5.348	2.156	5.341	2.190
2.120	3.593	3001	2.113	3.625	2001	4.396	1.949	4.385	2.000
2.113	3.625	3001	2.067	3.615	2001	4.385	2.000	4.312	1.985
2.067	3.615	3001	2.074	3.583	2001	4.312	1.985	4.323	1.933
2.028	3.573	3001	2.067	3.615	2001	4.249	1.918	4.312	1.985
3.034	3.808	3001	3.031	3.821	2001	5.856	2.293	5.852	2.314
2.988	3.799	3001	2.985	3.813	2001	5.782	2.278	5.778	2.300
2.711	3.744	3001	2.662	3.753	2001	5.341	2.190	5.262	2.205
2.067	3.615	3001	2.108	3.651	2001	4.312	1.985	4.377	2.042
3.031	3.821	3001	3.028	3.837	2001	5.852	2.314	5.847	2.340
2.985	3.813	3001	2.982	3.830	2001	5.778	2.300	5.773	2.328
2.662	3.753	3001	2.612	3.768	2001	5.262	2.205	5.182	2.229
2.519	3.752	3001	2.473	3.745	2001	5.034	2.204	4.960	2.192
2.149	3.690	3001	2.103	3.683	2001	4.442	2.105	4.368	2.093
2.108	3.651	3001	2.010	3.667	2001	4.377	2.042	4.220	2.068
3.028	3.837	3001	3.026	3.854	2001	5.847	2.340	5.843	2.366
2.982	3.830	3001	2.933	3.840	2001	5.773	2.328	5.695	2.344
2.612	3.768	3001	2.654	3.798	2001	5.182	2.229	5.250	2.278
2.608	3.791	3001	2.562	3.784	2001	5.176	2.266	5.102	2.255
2.519	3.752	3001	2.515	3.777	2001	5.034	2.204	5.027	2.244

2.515	3.777	3001	2.469	3.770	2001	5.027	2.244	4.953	2.233
2.469	3.770	3001	2.473	3.745	2001	4.953	2.233	4.960	2.192
2.376	3.756	3001	2.330	3.749	2001	4.805	2.211	4.731	2.200
2.237	3.736	3001	2.130	3.729	2001	4.583	2.177	4.506	2.166
2.149	3.690	3001	2.144	3.722	2001	4.442	2.105	4.434	2.155
2.103	3.683	3001	2.098	3.715	2001	4.368	2.093	4.360	2.144
2.098	3.715	3001	2.010	3.667	2001	4.360	2.144	4.220	2.068
3.026	3.854	3001	3.023	3.870	2001	5.843	2.366	5.839	2.393
2.933	3.840	3001	2.977	3.864	2001	5.695	2.344	5.765	2.383
2.654	3.798	3001	2.605	3.815	2001	5.250	2.279	5.170	2.304
2.608	3.791	3001	2.605	3.815	2001	5.176	2.266	5.170	2.304
2.605	3.815	3001	2.558	3.809	2001	5.170	2.304	5.096	2.294
2.558	3.809	3001	2.562	3.784	2001	5.096	2.294	5.102	2.255
2.558	3.809	3001	2.512	3.802	2001	5.096	2.294	5.022	2.284
2.376	3.756	3001	2.372	3.784	2001	4.805	2.211	4.799	2.255
2.372	3.784	3001	2.326	3.778	2001	4.799	2.255	4.724	2.245
2.326	3.778	3001	2.330	3.749	2001	4.724	2.245	4.731	2.200
2.237	3.736	3001	2.233	3.765	2001	4.583	2.177	4.576	2.225
2.233	3.765	3001	2.186	3.759	2001	4.576	2.225	4.502	2.215
2.186	3.759	3001	2.190	3.729	2001	4.502	2.215	4.508	2.166
2.144	3.722	3001	2.093	3.747	2001	4.434	2.155	4.353	2.195
3.023	3.870	3001	3.021	3.887	2001	5.839	2.393	5.836	2.419
2.977	3.864	3001	2.928	3.876	2001	5.765	2.383	5.687	2.402
2.695	3.849	3001	2.648	3.844	2001	5.315	2.359	5.240	2.350
2.605	3.815	3001	2.602	3.838	2001	5.170	2.304	5.166	2.342
2.558	3.809	3001	2.555	3.833	2001	5.096	2.294	5.091	2.333
2.512	3.802	3001	2.508	3.828	2001	5.022	2.284	5.017	2.324
2.093	3.747	3001	2.089	3.779	2001	4.353	2.195	4.346	2.247
3.021	3.887	3001	3.019	3.903	2001	5.836	2.419	5.833	2.446
2.928	3.876	3001	2.973	3.899	2001	5.687	2.402	5.759	2.438
2.695	3.849	3001	2.693	3.871	2001	5.315	2.359	5.311	2.394
2.693	3.871	3001	2.648	3.844	2001	5.311	2.394	5.240	2.350
2.602	3.838	3001	2.595	3.862	2001	5.166	2.342	5.162	2.379
2.555	3.833	3001	2.552	3.857	2001	5.091	2.333	5.087	2.372
2.552	3.857	3001	2.506	3.853	2001	5.087	2.372	5.012	2.365
2.506	3.853	3001	2.508	3.828	2001	5.012	2.365	5.017	2.324
2.089	3.779	3001	2.086	3.811	2001	4.346	2.247	4.341	2.298
1.805	3.784	3001	1.759	3.779	2001	3.893	2.254	3.819	2.247
3.019	3.903	3001	3.018	3.917	2001	5.833	2.446	5.831	2.467
3.018	3.917	3001	2.973	3.899	2001	5.831	2.467	5.759	2.438
2.599	3.862	3001	2.597	3.881	2001	5.162	2.379	5.159	2.410
2.504	3.873	3001	2.457	3.869	2001	5.009	2.398	4.935	2.391
2.270	3.854	3001	2.223	3.850	2001	4.636	2.366	4.561	2.360
2.086	3.811	3001	2.036	3.834	2001	4.341	2.298	4.262	2.334
1.990	3.830	3001	1.943	3.826	2001	4.185	2.328	4.113	2.322
1.896	3.822	3001	1.849	3.818	2001	4.038	2.315	3.964	2.309
1.805	3.784	3001	1.803	3.814	2001	3.893	2.254	3.889	2.303
1.803	3.814	3001	1.759	3.779	2001	3.889	2.303	3.819	2.247
2.597	3.881	3001	2.596	3.905	2001	5.159	2.410	5.156	2.448
2.504	3.873	3001	2.502	3.899	2001	5.009	2.398	5.006	2.438
2.502	3.899	3001	2.455	3.895	2001	5.006	2.438	4.932	2.433
2.455	3.895	3001	2.457	3.869	2001	4.932	2.433	4.935	2.391
2.270	3.854	3001	2.268	3.883	2001	4.636	2.366	4.632	2.413
2.268	3.883	3001	2.221	3.880	2001	4.632	2.413	4.556	2.408
2.221	3.880	3001	2.223	3.850	2001	4.558	2.408	4.561	2.360
2.036	3.834	3001	2.034	3.867	2001	4.262	2.334	4.258	2.387
2.034	3.867	3001	1.987	3.864	2001	4.258	2.387	4.184	2.382
1.987	3.864	3001	1.990	3.830	2001	4.184	2.382	4.186	2.328
1.943	3.826	3001	1.940	3.861	2001	4.113	2.322	4.109	2.377
1.940	3.861	3001	1.893	3.857	2001	4.109	2.377	4.034	2.372
1.893	3.857	3001	1.896	3.822	2001	4.034	2.372	4.038	2.315
1.849	3.818	3001	1.800	3.651	2001	3.964	2.309	3.984	2.362
2.596	3.905	3001	2.594	3.931	2001	5.156	2.448	5.154	2.483
1.800	3.851	3001	1.844	3.894	2001	3.984	2.362	3.955	2.431
2.594	3.931	3001	2.546	3.953	2001	5.154	2.483	5.077	2.525
2.406	3.948	3001	2.359	3.947	2001	4.852	2.518	4.777	2.515

1.844	3.894	3001	1.796	3.929	2001	3.955	2.431	3.878	2.486
2.546	3.953	3001	2.593	3.976	2001	5.077	2.525	5.151	2.562
2.406	3.948	3001	2.405	3.973	2001	4.852	2.518	4.851	2.557
2.405	3.973	3001	2.358	3.972	2001	4.851	2.557	4.776	2.556
2.358	3.972	3001	2.359	3.947	2001	4.776	2.556	4.777	2.515
2.030	3.967	3001	1.983	3.966	2001	4.252	2.547	4.177	2.545
1.796	3.929	3001	1.795	3.963	2001	3.878	2.486	3.877	2.540
2.593	3.976	3001	2.545	3.998	2001	5.151	2.562	5.076	2.596
2.030	3.967	3001	2.029	3.997	2001	4.252	2.547	4.251	2.595
2.029	3.997	3001	1.982	3.997	2001	4.251	2.595	4.176	2.595
1.982	3.997	3001	1.983	3.966	2001	4.176	2.595	4.177	2.545
1.795	3.963	3001	1.795	3.996	2001	3.877	2.540	3.876	2.594
2.639	4.023	3001	2.593	4.024	2001	5.226	2.637	5.151	2.638
2.545	3.998	3001	2.499	4.025	2001	5.076	2.596	5.001	2.640
1.795	3.996	3001	1.842	4.036	2001	3.876	2.594	3.952	2.658
2.639	4.023	3001	2.687	4.038	2001	5.226	2.637	5.302	2.661
2.593	4.024	3001	2.593	4.041	2001	5.151	2.638	5.152	2.665
2.499	4.025	3001	2.546	4.042	2001	5.001	2.640	5.077	2.668
1.842	4.036	3001	1.796	4.064	2001	3.952	2.658	3.878	2.702
2.687	4.038	3001	2.641	4.073	2001	5.302	2.661	5.229	2.717
2.593	4.041	3001	2.594	4.075	2001	5.152	2.665	5.154	2.721
2.594	4.075	3001	2.548	4.078	2001	5.154	2.721	5.079	2.725
2.548	4.078	3001	2.546	4.042	2001	5.079	2.725	5.077	2.668
1.796	4.064	3001	1.845	4.116	2001	3.878	2.702	3.956	2.785
2.641	4.073	3001	2.596	4.095	2001	5.229	2.717	5.156	2.752
2.549	4.098	3001	2.502	4.101	2001	5.081	2.757	5.006	2.762
1.845	4.116	3001	1.893	4.142	2001	3.956	2.785	4.034	2.827
2.596	4.095	3001	2.597	4.119	2001	5.156	2.752	5.159	2.789
2.549	4.098	3001	2.551	4.122	2001	5.081	2.757	5.084	2.796
2.502	4.101	3001	2.504	4.126	2001	5.006	2.762	5.009	2.802
1.893	4.142	3001	1.943	4.174	2001	4.034	2.827	4.113	2.878
2.597	4.119	3001	2.646	4.135	2001	5.159	2.789	5.237	2.816
2.551	4.122	3001	2.553	4.145	2001	5.084	2.796	5.087	2.831
2.553	4.145	3001	2.506	4.149	2001	5.087	2.831	5.013	2.839
2.506	4.149	3001	2.504	4.126	2001	5.013	2.839	5.009	2.802
2.506	4.149	3001	2.459	4.154	2001	5.013	2.839	4.938	2.846
1.943	4.174	3001	1.946	4.205	2001	4.113	2.878	4.118	2.928
2.646	4.135	3001	2.602	4.166	2001	5.237	2.816	5.166	2.865
2.556	4.171	3001	2.509	4.177	2001	5.092	2.874	5.018	2.883
2.506	4.149	3001	2.509	4.177	2001	5.013	2.839	5.018	2.883
2.509	4.177	3001	2.462	4.182	2001	5.018	2.883	4.943	2.891
2.462	4.182	3001	2.459	4.154	2001	4.943	2.891	4.938	2.846
1.946	4.205	3001	1.950	4.243	2001	4.118	2.928	4.124	2.988
2.602	4.166	3001	2.651	4.181	2001	5.166	2.865	5.245	2.889
2.605	4.187	3001	2.558	4.193	2001	5.171	2.899	5.097	2.909
2.556	4.171	3001	2.558	4.193	2001	5.092	2.874	5.097	2.909
2.558	4.193	3001	2.512	4.200	2001	5.097	2.909	5.022	2.919
2.512	4.200	3001	2.509	4.177	2001	5.022	2.919	5.018	2.883
2.465	4.206	3001	2.419	4.212	2001	4.948	2.929	4.874	2.939
1.950	4.243	3001	2.000	4.268	2001	4.124	2.988	4.205	3.029
2.651	4.181	3001	2.608	4.209	2001	5.245	2.889	5.176	2.933
2.605	4.187	3001	2.608	4.209	2001	5.171	2.899	5.176	2.933
2.608	4.209	3001	2.562	4.216	2001	5.176	2.933	5.102	2.944
2.562	4.216	3001	2.558	4.193	2001	5.102	2.944	5.097	2.909
2.465	4.206	3001	2.469	4.229	2001	4.948	2.929	4.953	2.967
2.469	4.229	3001	2.422	4.236	2001	4.953	2.967	4.879	2.978
2.422	4.236	3001	2.419	4.212	2001	4.879	2.978	4.874	2.939
2.000	4.268	3001	2.051	4.292	2001	4.205	3.029	4.286	3.067
2.608	4.209	3001	2.474	4.260	2001	5.176	2.933	4.961	3.015
2.051	4.292	3001	2.104	4.323	2001	4.286	3.067	4.370	3.116
2.474	4.260	3001	2.478	4.283	2001	4.961	3.015	4.968	3.053
2.104	4.323	3001	2.109	4.352	2001	4.370	3.116	4.378	3.162
2.478	4.283	3001	2.484	4.314	2001	4.968	3.053	4.977	3.101
2.109	4.352	3001	2.254	4.361	2001	4.378	3.162	4.610	3.177
2.070	4.399	3001	2.024	4.409	2001	4.316	3.238	4.243	3.253
2.009	4.265	3001	2.763	4.276	2001	5.497	3.024	5.424	3.040

[illegible]	4.314	3001	2.584	4.327	2001		5.132	3.106	5.050	3.122
[illegible]	4.314	3001	2.397	4.357	2001		4.977	3.101	4.839	3.171
[illegible]	4.341	3001	2.319	4.378	2001		4.610	3.177	4.692	3.203
[illegible]	4.349	3001	2.077	4.429	2001		4.316	3.238	4.327	3.205
[illegible]	4.429	3001	2.324	4.439	2001		4.327	3.205	4.243	3.253
[illegible]	4.265	3001	2.415	4.291	2001		5.497	3.024	5.587	3.065
[illegible]	4.291	3001	2.763	4.276	2001		5.587	3.065	5.424	3.040
2.704	4.313	3001	2.633	4.336	2001		5.361	3.111	5.216	3.136
2.600	4.324	3001	2.587	4.347	2001		5.132	3.106	5.147	3.154
2.587	4.347	3001	2.534	4.327	2001		5.143	3.154	5.050	3.122
2.387	4.357	3001	2.495	4.392	2001		4.839	3.171	4.852	3.226
2.409	4.392	3001	2.305	4.378	2001		4.852	3.226	4.692	3.203
2.724	4.313	3001	2.726	4.321	2001		5.461	3.101	5.364	3.113
2.633	4.336	3001	2.598	4.355	2001		5.216	3.136	5.146	3.160
2.726	4.321	3001	2.824	4.325	2001		5.364	3.113	5.521	3.120
2.734	4.350	3001	2.643	4.375	2001		5.377	3.160	5.232	3.201
2.598	4.355	3001	2.598	4.368	2001		5.166	3.160	5.165	3.226
2.824	4.325	3001	2.831	4.349	2001		5.521	3.120	5.532	3.157
2.700	4.362	3001	2.761	4.375	2001		5.450	3.179	5.380	3.233
2.734	4.350	3001	2.696	4.389	2001		5.377	3.160	5.316	3.221
2.643	4.375	3001	2.651	4.402	2001		5.232	3.200	5.245	3.243
2.651	4.402	3001	2.590	4.388	2001		5.245	3.243	5.168	3.228
1.527	4.730	3001	1.482	4.751	2001		3.449	3.778	3.377	3.808
1.392	4.770	3001	1.247	4.791	2001		3.233	3.843	3.161	3.864
4.000	6.000	3002	4.172	.004	2002	OUTSIDE PLOT AREA	7.400	2.600	7.675	-3.795
.167	5.143	3002	4.100	4.839	2002	OUTSIDE PLOT AREA	1.275	4.427	7.400	2.600
3.078	2.790	4001				OUTSIDE PLOT AREA	5.926	.667		
3.120	3.070	4002					6.006	1.114		
2.700	4.340	4003					5.323	3.156		
2.062	2.026	4004				OUTSIDE PLOT AREA	4.304	-.554		
2.187	3.047	4005					4.375	1.878		
2.994	3.002	4006					5.792	2.204		
2.303	3.002	4007					4.605	2.204		
1.370	4.704	4009					3.137	3.853		
3.001	2.794	5001				OUTSIDE PLOT AREA	5.932	.672		
2.922	3.279	5002					5.677	1.447		
1.943	4.063	5003					3.954	2.703		
2.441	4.043	5004					4.918	2.663		
2.575	4.122	5005					5.122	2.796		
2.349	4.223	5006					4.762	2.956		
2.600	4.331	5007					5.291	3.129		
2.245	3.241	6001					4.596	1.387		
2.060	3.237	6002					4.300	1.350		
2.312	3.726	6003					4.733	2.162		
2.523	3.779	6004					5.039	2.247		
2.100	3.947	6005					4.364	2.515		
3.001	2.796	7001				OUTSIDE PLOT AREA	5.931	.675		
3.120	3.070	7002					6.005	1.114		
2.062	2.025	7003				OUTSIDE PLOT AREA	4.303	-.555		
2.186	3.045	7004					4.374	1.074		
2.909	3.733	7005					5.752	2.174		